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Saskatchewan Museum of Natural History Photo

Sand dunes, south of Lake Athabasca

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I DIDN'T KNOW . . . .

"I didn't know that Saskatchewan had a flora." She was a pretty girl and, as I discovered later in the class, intelligent. Yet she expressed a view that is unfortunately shared by all too many residents of Saskatchewan. The particular course I was involved with this summer had in addition to lectures, fourteen four-hour laboratory periods, six of which were spent in the field. In both laboratory and field students frequently voiced their amazement. As I heard their expressions of surprise when they saw a new sight, I often thought how much people miss when they do not take the trouble to look with an eye that really sees.

During each of our field trips we tried to visit more than one kind of habitat in uncultivated areas. This was not difficult because around wet spots there is usually a shrubby or treed area and above this, grasslands.

Native grasses have real beauty and interest and vary according to position on north-and-south-facing slopes, soil type and moisture availability. Native grasslands are rich in forbs such as scarlet mallow, chamaerhodos, cinquefoil, psoralea, astragalus and many others. On the prairie, above the claybanks of Avonlea Creek where the gumbo evening-primrose was in full bloom, we squatted on the short grass to key out the dainty pennyroyal, the mousetail and the delicate soft grey Pursh's plantain. On fairly open sand dunes west of Caron we examined a *Cyperus* and spent some time identifying the western virgin's-bower, the rare hairy prairie-clover and the bur-ragweed. In one low meadow the western red lily flamed among smooth camas, fringed loosestrife and windflower.

In the woods we saw a rich harvest of beaked hazelnuts and sampled fruits of goose-berries and various raspberries and currants. On some slopes we were careful to identify the poison ivy and distinguish it from wild sarsaparilla, baneberry and large divided leaves of several other plants with which it might easily be confused by an amateur botanist. In some such spots we identified the fragile fern and on two occasions the grape fern. On the same day we found in abundance red osier dogwood, high bush cranberry, saskatoonberry, chokecherry and pincherry.

When we went into moister areas, I gathered from the reaction of the students that most people tend to shun our bogs and willow thickets. This is indeed a pity for not only are the willows an extremely variable and interesting group but associated with them are rare and beautiful flowers. Here as elsewhere we stepped carefully to avoid crushing any rare specimen and we avoided picking in order not to affect or reduce the genetic diversity. In these damp spots we saw grass of parnassus, mealy primrose, shooting star, various orchids and wintergreen and the graceful twin flower called *Linnaea* for the first taxonomic botanist, Carl Linnaeus.

We examined at one point the butterwort whose greasy leaf glands have the ability to digest and utilize the food in pollen grains and in small insects. In a small pond we fished out some bladderwort to examine the little traps which the plant uses to catch and digest mosquito larvae and other small aquatic animals.

On the prairie slopes of the Missouri Coteau we looked at broom-rape — a parasite on the sage which was abundant as the result of overgrazing. In a wet springy bank where giant reed grass was already eight feet tall and the sunflowers and mints were luxuriantly rank and vegetative, we saw the long sickly orange strands of the dodder spreading from plant to plant and spiralling up the lengths of their hosts. The dodder, another of those parasites completely unable to make any of their own food, flowers abundantly; it illustrates the fact that the more hazardous the survival the more productive must be the seed set. A fascinating plant . . . "I didn't know Saskatchewan had a flora."

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POPULATION THE ULTIMATE POLLUTANT

by **C. F. Bentley,** Department of Soil Science, University of Alberta

It is not only nature lovers and ecologists who are today concerned about what pollutants are doing to plants, animals, man and the landscape. Many people are aware of some, at least, of the many effects of pollution on ecosystems of both land and water. Some examples which have been spectacularly publicized have helped to create the new awareness. Items which illustrate this point include:

- The serious eutrophication of Lake Erie caused by the dumping of chemicals, huge amounts of sewage and industrial wastes, as well as soil erosion. Pollution-sparked algal blooms have seriously affected fish life and water quality.
- Mercury contamination of fish in Lake St. Clair, Lake Winnipeg, and Howe Sound, as well as of game birds in Alberta.
- Knowledge that in California the redwoods are dying as a result of man's chemical pollution of the atmosphere.
- The anticipated extinction of some species of birds, including eagles in the United States, due to effects of unanticipated residues from some pesticides.
- The necessity to move oysters out of the St. Lawrence River to unpolluted waters for several weeks before it is safe to harvest them for human food.
- Gully erosion in the Arctic affecting caribou migration and feeding caused by permafrost melting initiated by vehicular traffic which disturbed the fragile tundra vegetation.

Although the rising concern about pollution, the environment and ecosystems is heartening, it is disappointing that so few, even among highly educated, intelligent people, recognize the central position of the population problem in these matters. In fact, it is astonishing that the concern about environmental quality and preservation of plant and animal species as well as of ecosystems has not generated concern and action on the population problem. I must, therefore, devote most of this article to a discussion of some aspects of the exceedingly complex and difficult question of reasonably controlling human numbers in order to preserve the environment and save mankind.

The basic problem is the fact that the obvious has not been generally recognized: it is as axiomatic that increase in population and in per capita income result in increased pollution and other adverse effects on the environment as it is axiomatic that increases in population result in reductions of individual freedoms. Last winter a University of Alberta student, commenting in a special "pollution" issue of the student newspaper, wrote and said in effect: "It is time that we recognize that people are pollution."

Public unawareness and apathy about world (and Canadian) population problems are difficult to comprehend. The general refusal to accept the facts, or to act on them, is related to traditional beliefs which most people are unwilling to examine objectively. Unless it is defused, and very soon, the population bomb will devastate the environment to an unimagined extent — but inaction continues because of public avoidance of discussion and modification of some outmoded or discredited beliefs or stances. Three pertinent items of this type are:

- The tribal attitude that increase in population (i.e. that more people — in Canada or on earth) is necessarily good, desirable and generally beneficial.
- The dishonest public pretence that people intend and desire to have the numbers of children they are, in fact, having.
- The idea that parenthood is an inherent right of every individual,

and that it may be exercised without obligations, limitations, responsibilities or restraints.

Advances in modern medicine and public attitudes such as the foregoing combine to constitute a generally unrecognized danger. On a world basis, death control is probably the most extensively and effectively applied aspect of modern technology. The result has been a dramatic increase in the rate of population growth because birth control, in general, is not extensively and successfully practised. Too few know the numerical results and the awful portents of such a situation.

- The rate of world population increase is 10 times as fast as it was at the time of Columbus, and the rate of increase is still rising. In Columbus' day a year's population increase was about one million; this year's population increase will be over 70 million.
- Today, India's rate of population increase is about double the rate of increase at the time of independence, 23 years ago. (In 1947 India's population increased by about four million; the 1970 increase will be nearly 14 million.)
- The death rate in Ceylon, once considered a disease-ridden tropical country, is now as low as the death rate in Britain.
- World population increase of the next four years will exceed the present population of all North America, from the Panama Canal to the North Pole.

Barring major catastrophes (war, famine or disease), an approximate doubling of world population by the year 2000 is virtually certain. The effects of such a development on planet earth merit study by all who are interested in preservation of ecosystems, plant and animal species, as well as in the conditions and quality of human life and living. To feed the increased population expected will drastically change the world. Merely to maintain current dietary levels, which on the average are unsatisfactory, will necessitate a 50-100 per cent increase in food production acreage during the next 30 years. Most of the good land is already in use. New land for food production will come from clearing jungles, draining swamps, irrigating deserts and cultivating ever steeper slopes. Such "developments" will exterminate some plant and animal species, destroy some ecosystems, cause a more than proportional increase in soil erosion, and displace much wildlife.

The ultimate results of such actions cannot be foreseen as there is no historical experience with manipulation of similarly huge areas in such a short period of time. Rapid agricultural development in the Prairie Provinces resulted in tremendous wind erosion problems during the 1920's and 1930's. Following World War II, a large virgin area in Tanzania was cleared and cultivated for production of groundnuts. That project was not only an economic disaster because of crop failures, but it also caused massive water erosion. Who can foretell the possible ecological effects of the greatly increased soil erosion which will be inevitable during the next 30 years? Will aquatic life be affected by turbidity of waters? Will the organic matter and nutrients in such eroded soil material spark extensive and frequent algal blooms? How serious might the effects of such blooms be? Will accelerated run-off upset ground water supplies upon which people have become dependent? Or will nuclear power become so low-cost that the anticipated erosion will be prevented by unimagined mechanization of soil conservation?

In any case, the face of the earth will surely be changed by the effects of increased population. More mines, highways, factories, traffic interchanges, rail lines, and housing will further mar and scar the landscape. There will be more urban cement jungles too. Human and animal wastes, chemicals from factories and fires and transportation and agriculture, refuse and debris of all types, will pervade and contaminate more and more of the land, water, and air. Trees in large forested areas of Europe are now

dying or are severely affected by atmospheric pollution. Can such pollution be reduced while population increases? Will pollution control be so costly that levels of living will decline? What will happen in the underdeveloped countries where the burden of dependents seriously hampers efforts to improve conditions? Urban ghettos are bad environments, and they are growing very fast. Will it be possible to reverse this trend when the people concerned are breeding so rapidly.

Increased population densities, whether of people or crops or animals, constitute conditions which favour development and rapid spread of diseases and insects. Extensive use of chemicals for control of such pests is probable, and some pollution problems will almost surely result. An unattractive alternative to such controls of food crop pests is an increase of malnutrition and of the poverty which accompanies it; these conditions are normally accompanied by degradation of both people and the environment in which they live.

There is another aspect of greater population density which is of increasing concern to me. Animal studies have established that under natural conditions, many species of mammals and birds have distinct territorial requirements for normal health and reproduction. Populations of some species are controlled by the territorial needs since only males with a "territory" can acquire females or can mate. Laboratory studies with animals have proven that psychological problems and behaviour aberrations result when populations became dense even if there is considerable space and other conditions are ideal. Man is an animal too. With urbanization and population increasing rapidly, human psychological problems may be aggravated. It is perhaps true that deviant human behaviour receives greater publicity than formerly but human population pressures are at least partly responsible for some of these contemporary problems.

We live in the Space Age, and the human situation on earth may be likened to conditions in a space ship. Apollo 14 will be designed to carry a crew of three to the moon. That space ship will not be roomy by earth standards, but the crew will be reasonably comfortable. Human ingenuity and careful planning might enable modifications so that a crew of six could be accommodated. Under such circumstances freedoms of movement and action by members of the crew would be more restricted. By drastic modifications, much greater congestion, and with clearly an inferior environment within the space ship, it might be possible to crowd in a crew of 12 without enlargement of the ship. Under such circumstances, the journey to the moon would be something of an endurance test for the crew. How much discomfort can one endure? But it would be quite impossible to jam a crew of 300 into Apollo 14 regardless of how carefully the members were selected for small size and how willing they were to make the journey under spartan conditions. For one thing, recycling of the wastes, control of carbon dioxide, and similar problems would be too complex for the limited space and resources within the space ship.

Here on earth, man's application of science to the problems of food production and pollution control can certainly make it possible to accommodate more people. Perhaps by the year 2000, science will enable the expected seven billion people to enjoy an improved quality of life and living: frankly I doubt that such will actually be the case for the average person if or when there are seven billion people on earth. However, if it were possible for the present rate of population increase to continue to the year 2200, there would then be over 350 billion people on earth — an increase comparable to a crew of 300 in Apollo 14. Clearly, it is impossible for human population to continue increasing at current rates for more than a very few decades.

Justification for the foregoing pessimism can be very nicely illlustrated by reference to a "less developed" island nation I have visited. Senior government officials of that country

volunteered the following items of information:

- The current rate of population increase, thanks to modern death control, is over three per cent per year. If continued, population will double in less than 25 years.
- More than half of the population is under 15 years of age.
- Less than one-quarter of the adult population are sufficiently literate to recognize their own name in print.
- Not one member of a recently graduated teacher training class took employment as a teacher.
- Although much very steep land, with slopes of over 25 per cent, is already in use, the area of food production land is now less than one-third of an acre per person.
- The only known resource in addition to agricultural land is a small amount of tropical beach attractive to tourists.

As yet, the government of this country has not undertaken to encourage or assist its citizens to limit their reproduction. Population increase threatens that "island space ship." Without population control the environment and conditions of life there will almost surely deteriorate because consequential emigration is not likely to be possible. Moreover, even if emigration were possible it would not solve the basic problem of an excessive and debilitating rate of reproduction.

Although the rate of population increase in less developed countries is about two and a half per cent per year compared to a rate of less than one per cent per year in the industrialized countries, great caution should be exercised by the more favoured nations in advocating birth control for the poor countries. We need to put our own houses in order first. For example, in Canada, those classified as poor by the Economic Council are reproducing about twice as fast as other Canadians and there is no government policy in this country of either assisting or of encouraging Canada's poor to decrease their rate of reproduction. Therefore, if Canada were to advise other countries to encourage their citizens to reduce their rate of reproduction, this country would be open to charges of racism or indirect genocide.

The embarrassing fact is that a majority of people in less developed countries have governments that officially promote population control and endeavour to lower the birth rate. Because of the lack of such things as knowledgeable personnel, incentive programs and effective mass communication the population control programs of those countries are not very effective. Meanwhile, I do not know of one industrialized country, including Sweden and Japan, where official government policy encourages the citizens to limit their reproduction. Literally the "developed" countries are 20 years behind India, commonly regarded as a backward country, in the matter of population policy.

The world population explosion is a result of advancement in medical science in the industrialized countries. It was in these countries that the death rate first declined. As a consequence, viewed over the last two or three hundred years, population in the industrialized countries like Canada has increased much more rapidly than population in the poor countries. Citizens and governments of the less developed countries are aware of this fact and understandably suspicious of other nations which in effect say, "You people should have fewer children, but similar restrictions should not be placed on us."

Former U.S. Secretary of Labor, Willard Wirtz, who has become one of those greatly concerned about the rapid rate of population increase, has clearly explained why the industrialized countries need to take action at home. He has stated: "We must recognize our own situation before we can claim good international credentials. The idea that large families are all right for the affluent is a most convenient piece of nonsense. The affluent pollute the environment much more than those in underdeveloped countries, the average American 25 times more so than the average person in India, for example."

By that standard, Canada's part in pollution of the atmosphere, depletion of world resources, and devastation of the earth is comparable to about that of half a billion people in less developed countries. Therefore, many people in the poor countries consider it arrogant and improper for industrialized countries like Canada to suggest that poor countries should adopt population limitation programs when there are no similar programs in the industrialized countries advocating such policies. The poor countries regard Canada as an exceedingly richly endowed country and are increasingly resentful of our immigration policies which exclude their surplus population.

In the fall of 1969, a visiting speaker at the University of Alberta expressed the opinion that the four major contemporary problems facing mankind are: establishing and maintaining peace, the depletion of resources, pollution of the environment, and the population problem. I contend that the first three are merely different aspects of the population problem. If the Arabs and Israelis had more than enough land and water to meet their individual needs, the warring would not go on. If all the desired resources had been available within Germany and Japan, World War II would not have occurred. It is the increase in the population of Europe over the past 30 years together with a disproportionate increase in industries which have produced air pollution that is now killing millions of coniferous trees in Europe. People, too many people, are now the major problem.

It is because of the gravity of interactions and complications such as the foregoing ones that U. Thant has expressed the opinion that mankind must find a solution to the population problem during the 1970's if human society, as we know it, is to survive. I am not willing to be so specific regarding the time mankind has left to develop and successfully commence the implementation of a world program of population control; but I concur fully with the need for urgent action.

For too long we have listened to the unrealistic and ostrich-like contention that, technically, it is possible to sustain and feed much larger numbers of men. The earth and its resources are finite, and so too is the earth's capacity to sustain any type of life, including human life.

There is also a basic philosophical question to be considered, which we have unwisely evaded. What is man's goal on earth? Is it the maximum possible mass of humanity, regardless of the quality of life and conditions of living, regardless of the devastation created by his numbers and his effluents—or an intelligently and wisely limited population, living under conditions where there is still reasonable opportunity for privacy and individuality, on an earth where man lives in reasonable balance with the plants, animals and resources which determine the quality of his environment and of his living. Man has a choice!

Another philosophical question, seldom raised or contemplated, is whether mankind is justified in exterminating (whether by intent, accident or indirect result) much of the life on earth for the sole purpose of supporting a larger human population? Today, the redwoods, eagles, and kit foxes are all threatened with extinction. What will be eliminated next by man's ruthless multiplication?

Those who enjoy and understand nature know that any species has the inherent capacity through natural reproduction to overpopulate its environment. Since uncontrolled multiplication of any species has unpleasant consequences, there are natural controls. Man, through modern death control, has interfered with nature's harsh, but effective, methods of human population control, which, incidentally, used at least to maintain, if not improve, the quality of the human stock.

But if mankind wishes to exercise death control, it will be necessary to limit population through birth control. And so the question is: does mankind have the courage, wisdom and ingenuity to limit effectively, fairly and wisely, human reproduction? The future of mankind depends on the answer to that question.

POLLUTION IN THE NORTH SASKATCHEWAN RIVER

by **Patricia Tones,** 15 Bence Crescent, Saskatoon

With the announcement of a second pulp mill in Saskatchewan it is important to consider the effects of the Prince Albert Pulp Co. Ltd. mill on the water in the North Saskatchewan River.

As a part of a M.Sc. program at the University of Saskatchewan, Saskatoon I sampled the North Saskatchewan River between Prince Albert and Cecil Ferry. My survey sampled the river twice a month from February 1968 to August 1968 (before the mill began production) and from September 1968 to June 1969 (after the mill began production). It gives a useful "before" and "after" comparison and provides useful background information on the effect of a pulp mill on a large Saskatchewan river.

To obtain a measure of pollution I counted coliform bacteria using the membrane filter technique (American Health Association *et al.* 1965). Since a simple conclusive test for pathogens is not available, coliform bacteria which are present in large numbers in feces are generally accepted as pollution indicators.

The Water Pollution Control Branch (1968) suggested that water containing 10,000 coliform bacteria/100 ml was doubtful and water containing 20,000 coliform bacteria/100 ml was badly polluted (Table 1). The maximum limit recommended for waters in the "recreation, fish and wildlife" category was 5,000 coliform bacteria/100 ml.

My results presented in Table 2 may be compared to criteria suggested by the Saskatchewan Water Resources Commission in Table 1. As an additional check, samples were sent to

Winter photo of North Saskatchewan River below Prince Albert showing pulp mill waste entering from left and flowing down river to Cecil Ferry.

Table 1. Criteria for assessing pollution.

Stream condition	Coliform bacteria/100 ml
very clean	50
clean	1,000
fairly clean	5,000
doubtful	10,000
bad	20,000

the Public Health Laboratory, Regina, on June 11, 1969. Their results agreed with my high coliform counts in the mill effluent and also verified that the bacteria were of fecal origin. It is obvious from the high coliform counts that the North Saskatchewan River below the Prince Albert Pulp Co. mill is unsafe for any use.

At present the Prince Albert Pulp Co. Ltd. mill has no sewage treatment facilities. Because the sanitary sewers join the industrial sewers above the settling ponds, domestic sewage is mixed with large amounts of warm nutrient-rich wastes.

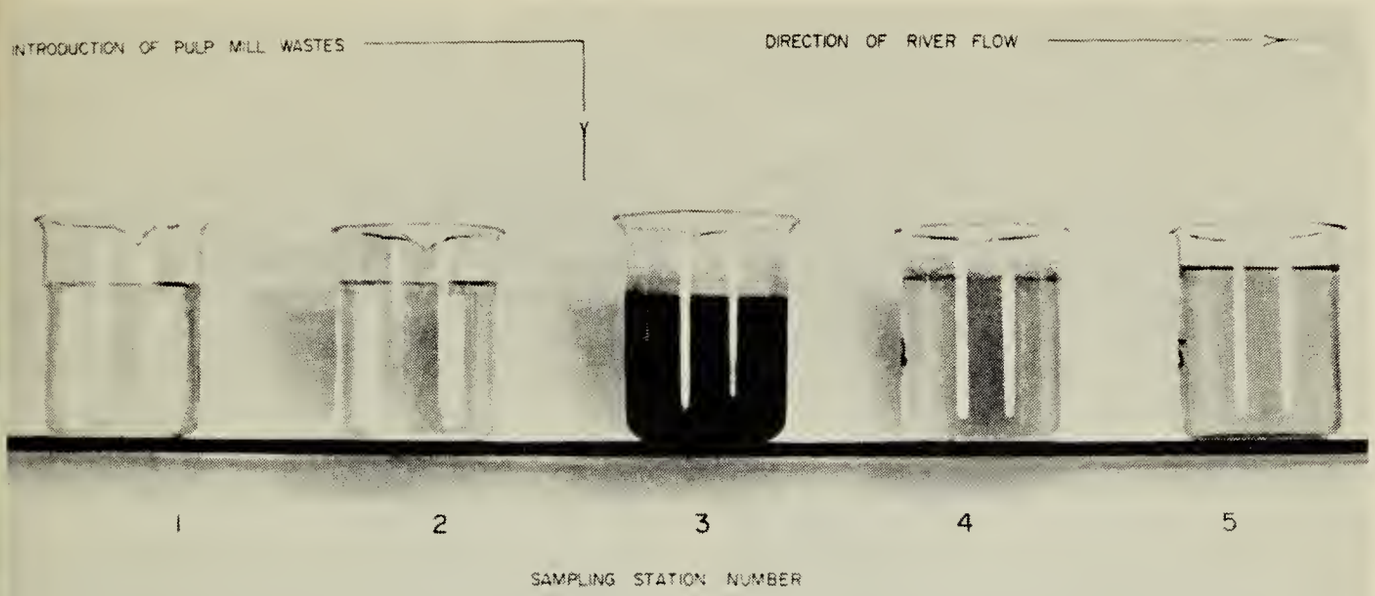
From the mill approximately 30 million gallons per day of dark brown odoriferous waste containing some foam and small amounts of fibre were discharged into the river. The "clear liquid sewage" described in the Blue Jay, 26:170-171 must not be confused with "colourless" since I was unable to see test fish in a 5-litre glass aquarium containing the waste. The dispersion pipe also mentioned in that article is not in operation, resulting in a concentration of the waste on the north side of the river. The open ditch carrying the waste is shown running horizontally across the centre of the aerial photograph meeting the ice covered river at "3". The waste flows towards the Cecil Ferry, "5", at the top of the picture where the concentration of waste on the north (left) side can be easily seen. The numbers on this photograph are the sampling stations. The average river pH was 8.5 while the effluent varied erratically from 10.0 to less than 6.8.

A fish bioassay and a survey of benthic macroinvertebrates were included to evaluate the effect of the mill effluent on river fauna. Sampling of macroinvertebrates in the late spring of 1968 ("before") and 1969 ("after") yielded mainly immature stages of stoneflies, mayflies and chironomids. The results showed severe reduction of both genera and numbers on the north side 1.3 miles below the outfall in 1969. The number of genera had returned to normal at the Cecil Ferry but the total number counted was reduced. In the fish bioassay (Amer. Public Health Ass. *et al.* 1965), 50% of rainbow trout parr died in an 18% solution of the effluent. A similar bioassay with brook stickleback, a less sensitive fish, resulted in no deaths in the 96-hour test period. The effect of the effluent on natural fish populations is unknown but no fish kills occurred during the survey.

The condition of the river, particularly its ability to support life, is dependent on dissolved oxygen which normally approaches saturation in the North Saskatchewan River except during periods of ice cover. Reed (1962)

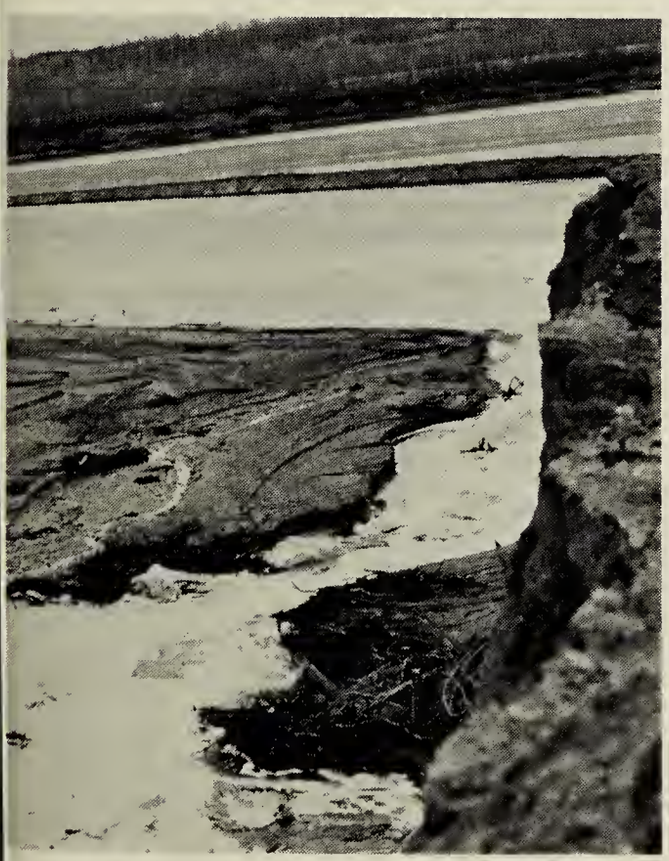
Table 2. Average concentrations of coliform bacteria in the North Saskatchewan River (bacteria/100 ml).

Location	Coliform bacteria	
	Jan. '68 to Aug. '68	Sept. '68 to June '69
above Prince Albert	71	125
pulp mill pump house	5,570	8,356
mill effluent outfall	978	85,800,000
Cecil Ferry	989	4,520,000 (north side)
		20,000 (south side)



APPEARANCE OF WATER SAMPLES TAKEN FROM NORTH SASKATCHEWAN RIVER

reported minimum oxygen levels of less than 1 cc/l (1.4 mg/1) in 1958 attributed to pollution at Edmonton. The minimum I recorded for the river was 4.8 mg/l in 1968 and 2.8 mg/l in 1969, which represented an encouraging improvement. Generally, 5 mg/l of dissolved oxygen is recommended for varied fish populations with a minimum of 3 mg/l for short durations. Minimum oxyger levels at the Cecil Ferry were the same as those above the mill although little or no oxygen was present in the area immediately below the effluent outfall.



Pulp mill waste entering North Saskatchewan River.

The average biochemical oxygen demand (BOD) of the waste was within the limits of 50,000 lbs day set by the Saskatchewan Water Resources Commission (later reduced to 40,000 lbs/day). These limits are very liberal when compared to the City of Saskatoon which is limited to 30,000 lbs/day with an expected reduction to 20,000 lbs/day.

It is true that the North Saskatchewan River can provide ample water to dilute toxic materials and also, that it has good natural aeration to compensate for the high oxygen demands placed on it (except during winter months). But we, as naturalists, must ask what planning is being done on behalf of the environment at the site of the second mill to be built by the same company. It is more useful to question now than to lament later.

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THE CYPRESS HILLS: VISITORS AND LAND USE

by **Robert C. Scace,** Department of Geography, The University of Calgary

The American geographer, Gilbert F. White, has said, "At the heart of managing a natural resource is the manager's perception of the resource and of the choices open to him in dealing with it. At the heart of decisions on environmental quality are a manager's views of what he and others value in the environment and can preserve or cultivate." (White, 1966, p. 105). Decisions made with respect to public reserves in Canada are of particular interest for from them are derived a multiplicity of products, the acquisition of which at source may precipitate not only competition and conflict between specific resource users but may also deny the principle of public welfare, which is supposed to be the central tenet in the administration of these areas.

The provincial parks and forest reserves of Alberta and Saskatchewan are areas that are highly desirable for a variety of outdoor recreational experiences and increases in annual visitor totals attest to their growing popularity. However, many of these lands were first established as Dominion Forest Reserves about the turn of the century and land use management has traditionally favoured those individuals or groups who have until recently made the greatest use of the public land resources — production-oriented graziers, loggers, miners and so on. Policies for public reserves (other than national parks) which did not originate as federal forest reserves have tended to follow similar lines.

In contrast, the growing number of recreationists from urban environments who use these areas are primarily consumers. Spokesmen for this group oppose existing land use practices on many public reserves "asserting that the actions they seek to prevent are destructive of values which should be acknowledged." (Held, 1967, p. 154). They contend that prevailing multiple-use policies are largely indifferent towards changing social conditions, and that greater emphasis must be placed upon aesthetic values for which there is a real but less easily measured economic justification. This position is supported by professional workers in a great variety of disciplines, as well as by many civil servants.

Resource managers are thus faced with the difficult task of modifying existing policies for public reserves. The historic multiple-use approach to land management is inconsistent with the demands upon these areas for a variety of recreational experiences and the corresponding (and growing) outlay of public capital to provide facilities for visitors. However, one aspect of the resource management problem is of particular interest here. It is the attitude of a particular resource user, the recreationist, towards the maintenance of different types of land use in public reserves. Because of my interest in the perceptions, attitudes and knowledge of the vacationing public I conducted a survey amongst visitors to the Cypress Hills Parks of Alberta and Saskatchewan.

The Cypress Hills have long been recognized by those who have visited them as "unique," "an anomaly," "an oasis in the desert," "the hills that shouldn't be," and other fittingly descriptive phrases which excite the imagination. Precisely why the Cypress Hills exist and support the flora and fauna that they do may only be vaguely understood by most people who visit them. But that visitors *generally* are aware that the Cypress Hills should be managed so as to protect those landscape features which do make them so ecologically important does seem an acceptable premise. Unfortunately, over time, and through the administrations of first, the Dominion government and subsequently, the respective provincial administrations, the landscape of the Cypress Hills reserves has been considerably modified. For example, despite several recom-

mendations made between 1954 and 1967 that efforts be made to reduce overgrazing in the West Block in Saskatchewan, the authors of the Master Plan for Cypress Hills Provincial Park (1969, p. 51) were forced to conclude that *"it would appear that there is little or no improvement in the West Block* despite efforts to more effectively distribute the grazing pressures." (Italics are those of the report).

What land uses, then does the *visitor* approve or disapprove of in these reserves? A questionnaire was prepared which listed 37 different types of land use activity which are or have been practised in the Cypress Hills reserves. Visitors were asked whether they believed that these activities should be permitted in the two provincial parks and the West Block. If they approved of a particular type of land use but had reservations as to how, where and when it should be permitted, their approval had to be a "qualified yes." The results of the questionnaire are shown on the accompanying table.

In August, 1969, during Labour Day weekend, the questionnaires were distributed at Elkwater townsite and the main service area in the Saskatchewan park amongst an unstructured sample of 172 people, predominantly among trailer and camper groups occupying campgrounds. (As the fire hazard was extremely high, all visitors had been confined to these locations). One hundred and fifty returns came from Alberta, reflecting a larger population from which to draw the sample, as well as limitations upon time. Slightly less than two-thirds of the respondents lived in Alberta, notably in Medicine Hat (about 60), and Calgary (about 27). About one-fifth came from Saskatchewan and a similar number from the United States, principally from Montana.

It is obvious from the results of the questionnaire that non-recreational land uses found little favour with the visiting public, even though some might be related to the quality of a recreational experience. For instance, some of the best fishing is enjoyed in reservoirs impounded by dams for

Table. Per cent Approval/Disapproval of land uses in the Cypress Hills.

Land Use	Complete Approval	Qualified Approval	Disapproval
Hiking	97	3	0
Row, sail boats	97	3	0
Swimming	96	4	4
Tent camping	96	3	1
Campers/trailers	95	4	1
Sport fishing	95	3	2
Driving, pleasure	90	8	2
Horse riding	89	7	4
Dancing	86	10	4
Downhill skiing	86	8	6
Cross country skiing	86	8	6
Winter carnivals	82	11	7
Blacktopping roads	85	7	8
Golf	82	8	10
Water skiing	78	11	11
Tree planting	75	12	11
Power boating	71	15	14
Scientific research	61	19	20
Rock collecting	68	11	21
Skidooing	62	17	21
Motels	58	20	22
Inst. camps	66	11	23
Summer cottages	64	12	24
Pesticide spraying	50	20	30
Artifact coll.	53	15	32
Trail bikes	53	11	36
Aeroplanes/copters	34	18	48
Hay cutting	29	20	51
Dams for irrigation	32	15	53
Cattle grazing	15	16	69
Car rallying	25	5	70
Picking flowers	21	8	71
Sport hunting	15	10	75
Prospecting	8	7	85
Timber cutting	4	10	86
Gravel extraction	6	4	90
Mining	2	3	95

irrigation purposes, yet for which only 47% approval was recorded. The disfavour with which the sample held any form of timber cutting, prospecting for minerals, gravel extraction and mining was impressively high. Yet, although the public may emphatically reject such land uses as being in some way incompatible with the purposes of a protected public park (and this may well explain the poor support for sport hunting), agencies administering these reserves are likely to pay scant attention to these sentiments. For example, in Alberta this year, the provincial government has given permission for gas well development in the Cypress Hills Park even though widespread public concern caused the cabinet to at least temporarly suspend its agreement with the company concerned. (*Calgary Herald*, May 13, 14, 15, 27, 1970).

The following remarks seem relevant to the data collected. The Cypress Hills are very attractive to the visiting public for a variety of recreational activities, but relatively few persons have any great concern about the number and character of recreational land uses which should be permitted.

Many respondents suggested that the Cypress Hills were very beautiful and should be "kept natural." The thought that mining and other non-recreational land uses might reduce this "naturalness" seems to have encouraged many to have disapproved of these land uses. Few, however, seemed aware that growing numbers of recreationists in the Hills, the activities they participate in, and the recreational facilities which they desire and are gradually being provided with, can also do much to modify the landscape of the parks. Thus, while this survey indicates what the visiting public approves of and presumably finds desirable in the way of land use, it also points to that same public as being unsophisticated in its appreciation of the possible consequences upon the landscape of getting what it wants.

A great responsibility devolves, therefore, upon the agencies responsible for the administration, management and planning of the Cypress Hills reserves. The recreational aspirations of the visiting public must be evaluated and then accommodated without seriously diminishing the quality of the resource and, in turn, the quality of the recreational experience. Managers must choose between perceived alternatives in the selection of recreational facilities, bearing in mind that the Cypress Hills environment is indeed a unique one, physically, ecologically and culturally. They must recognize that unless carefully planned, recreational developments will modify the environment of the Cypress Hills just as significantly as do the production-oriented activities.

There is, in turn, a responsibility on the part of researchers, individual citizens and organizations such as the Saskatchewan Natural History Society to ensure that proposed recreational developments in protected areas such as the Cypress Hills receive full public approbation before they are acted upon by the administrating agencies. It is suggested that the governments of the provinces of Alberta and Saskatchewan place their proposals for future development of the Cypress Hills parks before citizens of the province at public hearings. This procedure would complement a similar process now underway in all of our national parks and in Alberta for the Wilderness Areas Act, and would assure the public that its interests were being recognized in the planning process.

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LARGE COLONIES OF CASPIAN TERNS ON LAKES WINNIPEG AND WINNIPEGOSIS, 1970

by **Kees Vermeer,** Canadian Wildlife Service, Edmonton

Evans (*Blue Jay*, 28:68-71, June, 1970) described a nesting colony of Caspian Terns in 1969 near Spruce Island in Lake Winnipegosis. I investigated the same colony on June 4 and July 17, 1969. The terns had not completed clutch initiation by June 4 while July 17 was too late for a reliable nest count as the young terns wandered from nests.

On June 24, 1970, I surveyed those Caspian Tern colonies where 100 pairs or more were estimated to nest on islands on Lakes Winnipeg and Winnipegosis. To minimize the effects of human intrusion, nests were checked quickly. Thus colonies of about 500 nests are probably accurate only to the nearest 25.

Of five large colonies found (Table 1), the largest was on the reef near Spruce Island (Fig. 1). Except for one nest with chicks, aged approximately 0-2 days (Fig. 2), all nests observed contained eggs. As in 1969, Herring Gulls, California Gulls, Ring-billed Gulls, Common Terns, White Pelicans and Double-crested Cormorants also

Table 1. Number of nests and location of Caspian Tern colonies at Lakes Winnipeg and Winnipegosis, 1970.

Colony Location	Latitude	Longitude	No. of Nests
Lake Winnipegosis			
1. Reef east of Spruce Is.	53°04′N	100°30′W	615
2. Reef southeast of Denbeigh Pt.	52°49′N	99°46′W	95
Lake Winnipeg			
3. Reef southeast of Little Sandy Is.	52°58′N	97°59′W	535
4. Little George Is.	52°52′N	97°47′W	510
5. Reef at St. Martin Is.	52°17′N	98°00′W	490

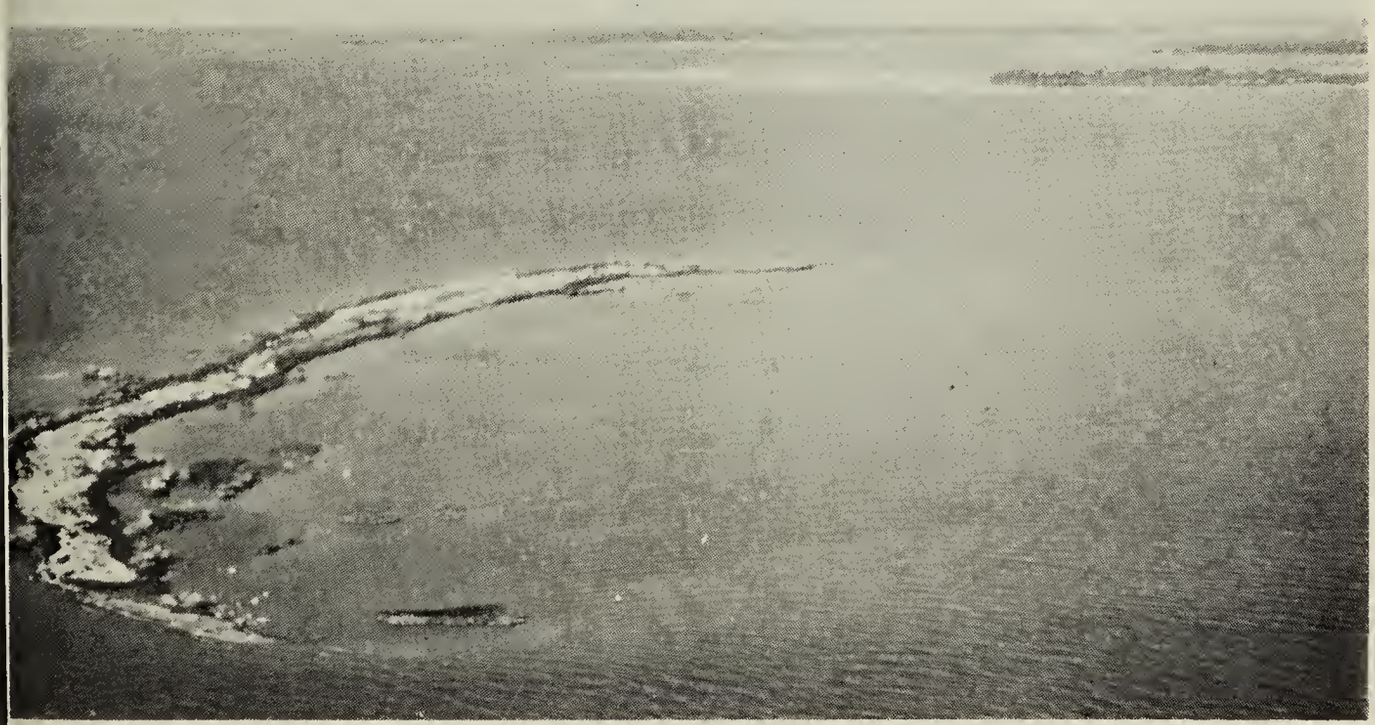

Fig. 1. Aerial photo of reef, in foreground, near Spruce Island on which 615 Caspian Tern nests were counted on June 24, 1970.

Fig. 2. Young Caspian Tern chicks in nest.

nested on that reef. Of 95 Caspian Tern clutches found on a reef near Denbeigh Point, one was incorporated into that of a Pintail clutch (Fig. 3). Herring Gulls, Ring-billed Gulls, Common Terns, Double-crested Cormorants and Great Blue Herons also nested on that reef. The nesting colonies in Lake Winnipeg near Little Sandy Island and St. Martin Islands were situated on bare sand reefs, but that on Little George Island was on a wooded island. Some of these Caspian Tern colonies are probably the largest recorded in the prairie provinces. Other Caspian Tern colonies well below 100 pairs were encountered in 1969 and 1970 on a reef (51°55′N; 100°03′W) in Sagemace Bay, Lake Winnipegosis and on a reef (52°22′N; 98°04′W) near Reindeer Island, Lake Winnipeg. In addition, one colony was found on a reef (54°09′N; 100°04′W) in Moose Lake and one pair of Caspian Terns was observed to defend a territory on a reef (50°49′N; 98°37′W) in Lake Manitoba in 1969.

Fig. 3. One Caspian Tern clutch incorporated within Pintail clutch and another typical Caspian Tern clutch.

TENTH ANNUAL MAY BIRD CENSUS
REGINA DISTRICT

On Saturday, May 16, 36 persons counted a total of 134 species and 17,634 individuals in the Regina area. The number of species (134) was disappointing as ideal weather conditions prevailed during the day. However, the weather had been quite cool the previous week, with a 3″ snowfall on Monday, and this might account for some of the species missing. The weather for the count day was mostly sunny and warm, winds light S.W. in the morning and brisk and westerly in the afternoon; temperature ranged between 42° and 78°.

Species list (1969 numbers in brackets):

Red-necked Grebe 1 (0); Horned Grebe 20 (18); Eared Grebe 8 (62); Western Grebe 4 (24); Great Blue Heron 1 (0); Black-crowned Night Heron 1 (4); American Bittern 1 (1); Mute Swan 2 (5); Whistling Swan 537 (10); Canada Goose 261 + 6 goslings (340); Mallard 977 (301); Gadwall 33 (30); Pintail 613 (157); Green-winged Teal 6 (13); Blue-winged Teal 83 (77); Cinnamon Teal 2 (0); American Widgeon 70 (52); Shoveler 432 (77); Redhead 28 (26); Canvasback 60 (63); Lesser Scaup 173 (130); Bufflehead 6 (7); Ruddy Duck 9 (34); Goshawk 1 (0); Red-tailed Hawk 2 (2); Swainson's Hawk 14 (9); Marsh Hawk 42 (7); Pigeon Hawk 1 (0); Sparrow Hawk 1 (1); Gray Partridge 4 (3); Sora 31 (7); American Coot 170 (39); Killdeer 60 (84); Spotted Sandpiper 5 (22); Solitary Sandpiper 21 (2); Willet 34 (22); Greater Yellowlegs 2 (2); Lesser Yellowlegs 12 (13); Pectoral Sandpiper 148 (64); White-rumped Sandpiper 22 (0); Baird's Sandpiper 61 (78); Least Sandpiper 123 (13); Short-billed Dowitcher 1 (9); Long-billed Dowitcher 9 (0); Stilt Sandpiper 3 (0); Semipalmated Sandpiper 50 (28); Marbled Godwit 12 (7); American Avocet 71 (62); Wilson's Phalarope 22 (27); Northern Phalarope 2 (21); Ring-billed Gull 131 (78); Franklin's Gull 22 (10); Common Tern 14 (43); Black Tern 20 (20); Rock Dove 56 (81); Mourning Dove 45 (62); Black-billed Cuckoo 1 (0); Great Horned Owl 2 + 3 young (5); Burrowing Owl 4 (2); Long-eared Owl 1 (1); Short-eared Owl 30 (2); Belted Kingfisher 1 (4); Yellow-shafted Flicker 45 (38); Yellow-bellied Sapsucker 6 (2); Downy Woodpecker 1 (1); Eastern Kingbird 11 (16); Western Kingbird 30 (55); Eastern Phoebe 2 (5); Yellow-bellied Flycatcher 1 (0); Traill's Flycatcher 4 (0); Least Flycatcher 22 (63); Olive-sided Flycatcher 1 (2); Horned Lark 367 (415); Tree Swallow 55 (139); Bank Swallow 1 (21); Barn Swallow 16 (86); Purple Martin 16 (29); Black-billed Magpie 36 (42); Common Crow 121 (102); Catbird 1 (4); Brown Thrasher 3 (34); Robin 188 (160); Hermit Thrush 1 (2); Swainson's Thrush 347 (81); Gray-cheeked Thrush 181 (52); Veery 3 (1); Ruby-crowned Kinglet 1 (2); Water Pipit 1 (0); Sprague's Pipit 2 (2); Loggerhead Shrike 52 (21); Starling 8 (42); Solitary Vireo 4 (2); Warbling Vireo 1 (0); Black-and-white Warbler 5 (9); Tennessee Warbler 7 (9); Orange-crowned Warbler 42 (11); Yellow Warbler 34 (45); Myrtle Warbler 171 (52); Blackpoll Warbler 13 (9); Palm Warbler 3 (2); Ovenbird 8 (3); Northern Waterthrush 15 (9); Yellowthroat 1 (4); House Sparrow 53 (457); Western Meadowlark 146 (249); Yellow-headed Blackbird 101 (53); Red-winged Blackbird 319 (545); Baltimore Oriole 20 (15); Rusty Blackbird 27 (2); Brewer's Blackbird 390 (226); Common Grackle 153 (136); Brown-headed Cowbird 103 (141); Rose-breasted Grosbeak 19 (27); Purple Finch 4 (20); Pine Grosbeak 3 (0); Pine Siskin 6 (0); White-winged Crossbill 6 (0); Rufous-sided Towhee 6 (3); Lark Bunting 2 (13); Savannah Sparrow 30 (17); Vesper Sparrow 45 (42); Slate-colored Junco 1 (0); Chipping Sparrow 81

(52); Clay-colored Sparrow 100 (118); Harris' Sparrow 67 (108); White-crowned Sparrow 81 (93); White-throated Sparrow 184 (90); Fox Sparrow 2 (2); Lincoln's Sparrow 74 (18); Song Sparrow 12 (10); McCown's Longspur 4 (82); Lapland Longspur 7816 (1252); Chestnut-collared Longspur 886 (124); Snow Bunting 1 (1).

Total Species, 134. Individuals 17,634. *Participants*: Jack Bailey, Jessie Bailey, Al Binnie, Betty Binnie, Greg Bobbitt, Bill Brownlee, Frances Churchill, Nancy Coppin, Lynne Cross, Iola Crouse, George Dodd, Lucy Eley, Elmer Fox, Pearl Guest, Florence Hailstone, Bernie Haysom, Keith Haysom, Linda Hebert, Mrs. M. Horn, Gwen Jones, Harold Jowsey, Harriet Jowsey, Jim Jowsey, Shirley Jowsey, Helen Keay, Ferne Lawrence, Betty MacGregor, Colin McConnell, Helen Morrison, Joan Powell, Connie Pratt, Joe Roberts, Mrs. G. Smith, Mrs. Sykes, Charles Thacker, Dan Walker. —Compiled by *Al* and *Betty Binnie*.

BLACK-CHINNED HUMMINGBIRD REPORTED AT REGINA

by **Shirley Jowsey** and **J. R. Jowsey**, 2635 19th Ave., Regina

Hummingbird arrivals before June 1 are not unusual here in Regina, but the sight of a hummingbird resting on a branch of our crabapple tree at noon on June 1, 1970 was unusual enough to alert us to examine the bird closely. The bird was sitting in a position where we could observe it through the window of the house without alarming it, even though it was only seven feet from us. As it turned to face us, we noticed the absence of the bright ruby throat patch which we had expected to see, since the Ruby-throated Hummingbird is the species likely to be observed in Regina.

Subsequent examinations of this bird on its return visits to the crabapple tree that day allowed us to observe all the field marks of the male Black-chinned Hummingbird. The main throat patch was distinctly black, as observed in several types of lighting, and the violet area below the black throat patch was clearly seen on two occasions.

In addition to the male hummingbird described above, we observed a female hummingbird several times on the evening of June 1. Since females of Black-chinned and Ruby-throated hummingbirds are similar in plumage patterns, we cannot be certain that the female was also a Black-chinned Hummingbird.

Unfortunately, we were not able to show the bird to another observer that day to get a verification of our identification, and no sightings of the pair were made on the following day. The Black-chinned Hummingbird is not on the provincial checking-list for Saskatchewan, and, to the best of our knowledge, it has not previously been reported in the province. W. Earl Godfrey in *The Birds of Canada* (1966) describes its status in Canada as that of a "scarce summer visitant, probably breeding, in southern interior British Columbia (Chilliwack east to Creston, north to Grindrod)." Its distribution is more general to the south of the border, and the A.O.U. *Check-List* (1957) gives it as breeding "from southwestern British Columbia and northwestern Montana (Columbia Falls) south through western Montana, central Idaho, western Colorado, New Mexico, and south-central and southwestern Texas . . . to northern Baja, California . . . Sonora, and extreme southwestern Chihuahua." No records of its occurrence in Alberta are cited in Salt and Wilks, *The Birds of Alberta* (rev. ed., 1966).

Local weather conditions did not suggest a reason for the sighting of this rare bird in Regina, but larger weather disturbances may have pressed a pair eastward from their normal migration route to Montana and southern British Columbia.

WINTER FOOD HABITS OF THE COMMON REDPOLL AND THE HORNED LARK IN SASKATCHEWAN

by **M. Larry Kerwin,** Regina, Saskatchewan

Two species of winter birds that are commonly encountered in southern Saskatchewan along roadsides and in open fields are the Common Redpoll *(Acanthis flamea)* and the Horned Lark *(Eremophila alpestris)*. The Redpoll is a winter visitant from the north. The Horned Lark is a summer resident which can be found through the winter (at least *some* years) in southwestern Saskatchewan. The literature suggests that during the winter months, weed seeds make up the bulk of the diet of both these species. This study, within 50 miles of Regina, suggests that the food used by these species in this part of Saskatchewan during the winter differs markedly from that reported in the literature.

Methods

Individuals of both species were collected between January 12 and March 24, 1970. In an attempt to reduce any bias introduced by the feeding behaviour of a certain flock no more than two individuals were taken from any one flock. In the case of the Horned Larks, flocks often consisted of fewer than 10 birds, whereas the Redpolls were generally in large flocks of from 50 to 150 birds. To study the birds' diets, food material from the esophagus and crop was removed, identified, air-dried at 60°C and weighed to the nearest milligram.

Results and Discussion

The results of the gravimetric analysis of the food material present in both the Redpolls and the Horned Larks is summarized in the Tables. Because of empty crops in some individuals, these results are based on a sample of 21 Redpolls and 16 Horned Larks.

Of the birds examined, the Common Redpolls showed a definite preference for the seeds of Russian Thistle *(Salsola kali)* while pigweed *(Amaranthus sp.)* and ragweed *(Ambrosia sp.)* were of lesser importance. In contrast, Martin *et al.* (1951) report that Russian Thistle makes up less than 2 per cent of the winter diet of Redpolls. Pigweed is used from 5 to 10 per cent while ragweed makes up 50 per cent or more of their diet.

The reason for the significant discrepancy between our results and those reported by Martin *et al.* is not obvious. Perhaps it is a function of the small sample used in this study or perhaps it is a function of the availability of this food item in this area. The need for further study is indicated.

Table 1. Analysis of food habits of Common Redpoll.

Food Item	Per cent Weight	Per cent Frequency
Russian thistle *(Salsola kali)*	95.9	100.0
Pigweed *(Amaranthus sp.)*	2.4	19.0
Ragweed *(Ambrosia sp.)*	1.7	14.3

Table 2. Analysis of food habits of Horned Lark.

Food Item	Per cent Weight	Per cent Frequency
Wheat *(Triticum sp.)*	96.1	100.0
Pigweed *(Amaranthus sp.)*	1.7	43.7
Ragweed *(Ambrosia sp.)*	0.7	18.8
Oats *(Avena sp.)*	0.5	6.2
Flax *(Linum sp.)*	0.4	6.2
Curled dock *(Rumex sp.)*	0.3	6.2
Bristlegrass *(Setaria sp.)*	0.3	6.2

The most important food item in the diet of the Horned Larks collected during the study was commercial wheat *(Triticum sp.)*. Again, this result differs from those reported in the literature (Martin *et al.*, 1951; Bent, 1942; Godfrey, 1966) where weed seeds have been shown to make up the bulk of the winter diet of the Horned Lark.

While weed seeds are probably the main food of Horned Larks inhabiting native grasslands, it appears that in the cultivated fields near Regina they are taking advantage of the abundance of waste grain available along the roads and in the exposed portions of fields.

While wheat is equally as available to the Redpoll during the winter, wheat grains are undoubtedly too large for them to handle. During winters of deep snow, the Horned Lark probably makes more use of weed seeds and at such times there may be some competition between the two species.

Conclusion

In the area studied for this report the most important food item in the winter diet of the Common Redpoll seems to be Russian Thistle, while wheat makes up the bulk of the winter diet of the Horned Lark. This is in disagreement with the reported literature and may be the result of the agricultural practices of the Regina area. Since only a small sample was studied, further work is needed to check the validity of these conclusions.

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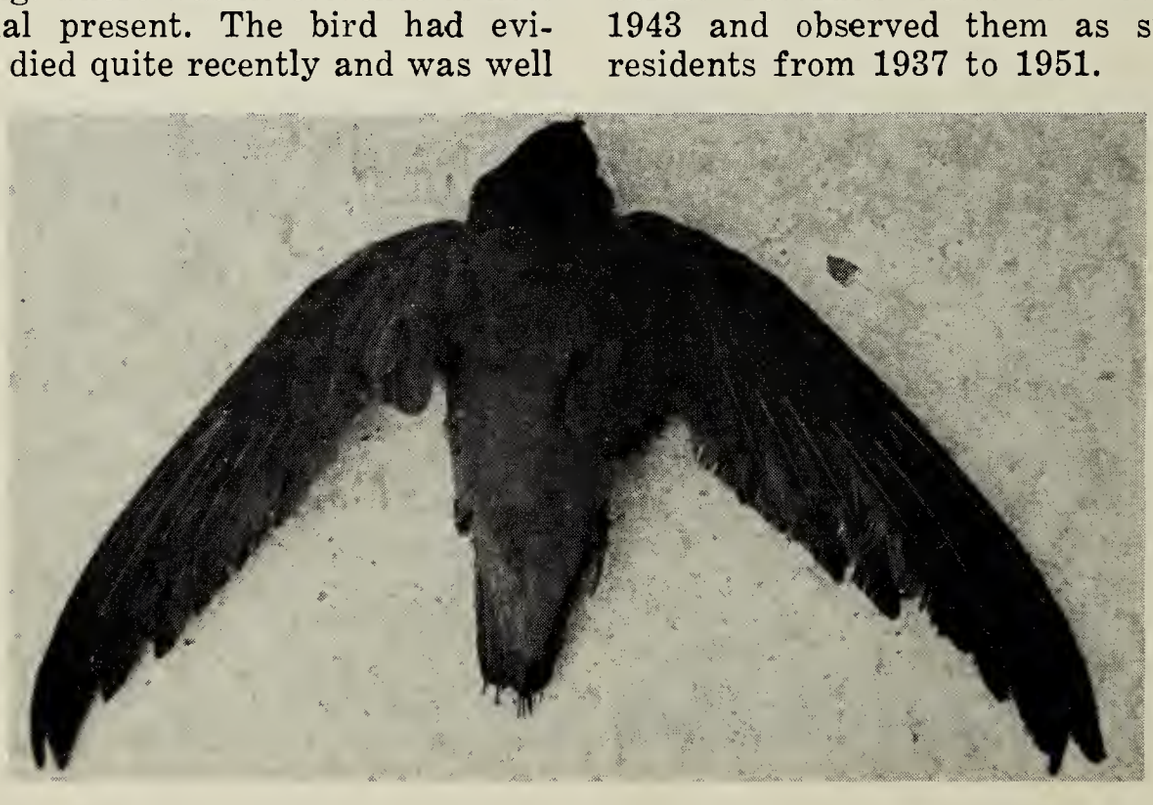
FIRST CHIMNEY SWIFT RECORD FOR YORKTON DISTRICT

by **Frank A. Switzer**, 140 Logan Crescent West, Yorkton

A dead male Chimney Swift was found in an active chimney at the farm of G. Switzer, eight miles east and seven miles south of Yorkton on July 15, 1967, during a routine chimney cleaning. There was no evidence of nest material present. The bird had evidently died quite recently and was well preserved, as evident from the enclosed photograph.

This is the first record for the Yorkton area, though specimens have been collected in the Pasquia Hills by Bard in 1937, and there are sight records for Indian Head, Regina and Cumberland House. The only nesting records for Saskatchewan to date are for Nipawin, where the late Maurice Street recorded nests in 1942 and 1943 and observed them as summer residents from 1937 to 1951.



GREAT HORNED OWLS OCCUPY ARTIFICIAL NESTING SITE

by **Lorne Scott,** Indian Head

Two Great Horned Owls have nested near the farm at Indian Head for the past several years. Shortly after the young left the nest in 1968, the old dead poplar in which they had nested fell down. After checking the area, I found that there were no other available nesting sites for the owls.

On July 19, 1968, my brother Brian and I decided to place a nest box in some tall poplars near the tree which had fallen down. The box was about two feet square and had sides five inches high. It was placed between two live poplar trees eighteen feet above the ground. We added small sticks and twigs to the box, which we obtained from an old magpie nest.

The sticks and twigs were placed around the sides of the box, thus forming a cup-like depression in the centre of the artificial nest. We added dead leaves to make it look natural, and left it.

When we returned in March 1969, we found the owls were not using our nest, but instead were nesting about one-half mile away in an old crow nest in another dead poplar tree. They successfully raised three young, but again the nest tree fell down later in the season.

We visited the area again in May, and observed a pair of Red-tailed Hawks nearby. I climbed the tree to see if they were nesting, and found they had lined the nest with strips of dead bark and some twigs with green leaves. The nest appeared ready for the laying of eggs. It was a mistake to climb the tree, as the adults abandoned the nest site. Since then I have avoided climbing Red-tailed Hawk nests while they were still building or when there were eggs in the nest.

The site was checked again this past spring on March 22. An adult owl flew off the box when we approached and we discovered three eggs in the nest. They all hatched, and the three young were banded on May 10.

I set up a similar box this past spring in another area, but it was not used this year. We hope to expand this program within the next few years, for perhaps we can increase the number of birds of prey by providing suitable nesting sites for them.

The recent changes to the provincial game act, resulting in complete protection for all birds of prey throughout the year should also benefit these valuable birds.

Photo by Gary Seib

Young Great Horned Owls in artificial nesting site

ARRIVAL AND CLUTCH INITIATION OF DOUBLE-CRESTED CORMORANTS AT LAKE NEWELL, ALBERTA

by **Kees Vermeer,** Canadian Wildlife Service, Edmonton

A colony of Double-crested Cormorants *(Phalacrocorax auritus)* with 148 nests was found on a three-acre island in Lake Newell (50°24'N; 111°58'W), Alberta in 1967 (Vermeer, 1969. *Can. Field Naturalist* 83(1):36-39). The island was revisited during the springs of 1968 and 1969 to obtain information on the arrival and clutch initiation of the cormorants.

Figure 1 shows mean daily air temperatures for April 1968 and 1969 at the Brooks weather station, approximately 12 miles NE of the cormorant colony. It can be seen that the air temperatures were generally considerably higher for the first three and a half weeks in April 1969 than for the same period in 1968. Nevertheless, Lake Newell became ice-free during the first two or three days in April 1968 while in 1969 ice did not disappear from the lake until the end of the third week of that month. The earlier disappearance of ice in 1968 was probably caused by the higher temperatures during the winter months preceding.

In 1968, the cormorants occupied the nesting island two weeks after the lake ice disappeared, while in 1969 the birds occupied the island several days before its disappearance. On April 17, 1969, I also observed cormorants occupying a nesting island in Cypress Lake (49°28'N; 109°28'W), Saskatchewan, while the ice was still present. However, both lakes were open along their peripheries when the cormorants arrived in 1969 and fish was probably available to them.

Table 1 shows that the cormorants

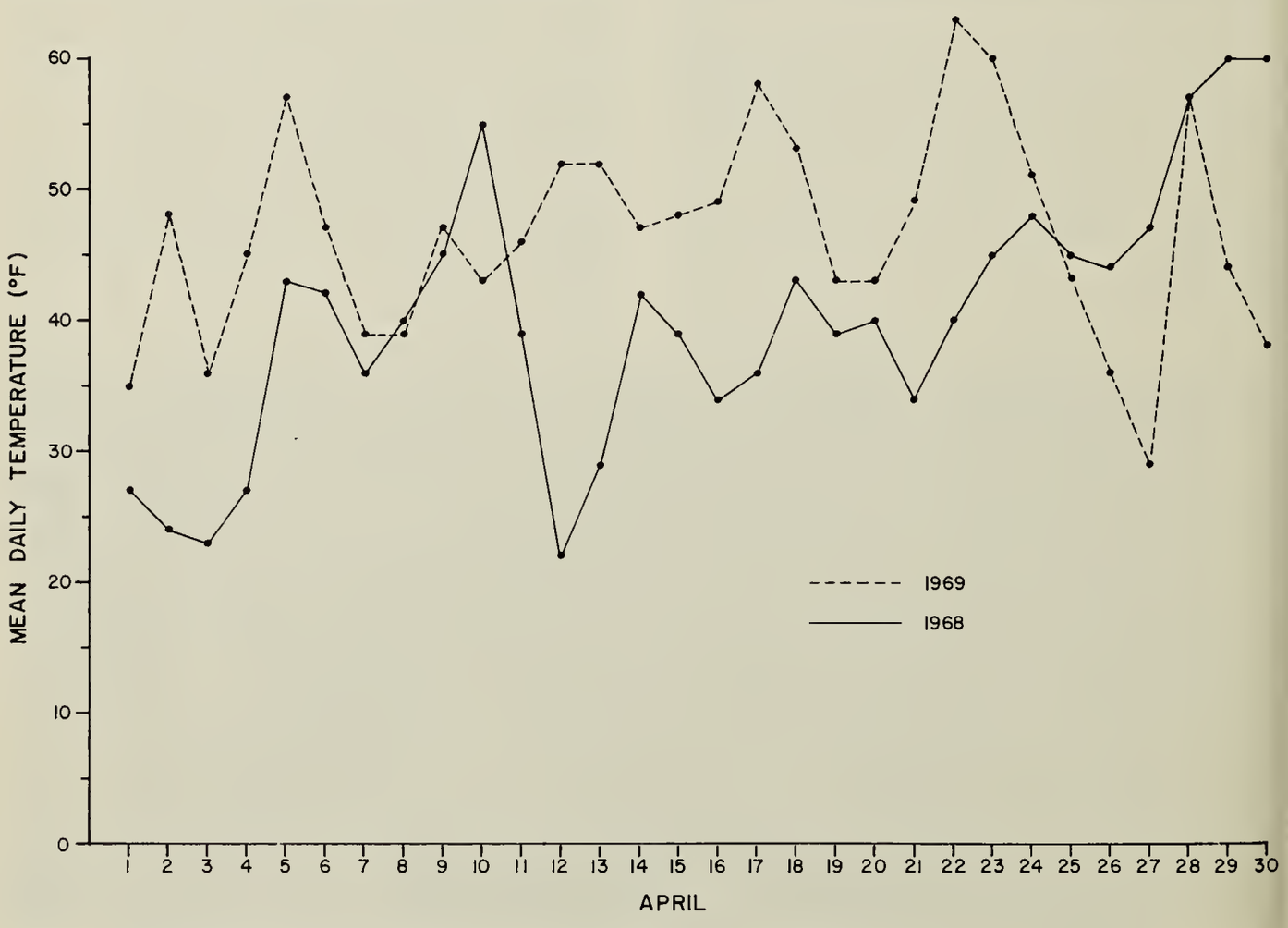


Fig. 1. Mean daily air temperature at Brooks, Alberta in April 1968 and 1969.

Table 1. Arrival and clutch initiation of Double-crested Cormorants on their nesting island in Lake Newell in April 1968 and 1969.

	Number of cormorants observed		Number of clutches observed		Mean clutch size	
	1968	1969	1968	1969	1968	1969
April 16-17	11	80	....	....	....	....
April 23	104	240	0	18	....	1.17
April 29-30	....	...	5	69	1.00	2.29

at Lake Newell arrived in numbers and started to lay earlier in 1969 than in 1968. From the comparison of data in Figure 1 and Table 1 it appears that the earlier clutch initiation in 1969 may be related to the earlier arrival of cormorants and/or the preceding higher air temperatures in April that year than in 1968.

Once clutch initiation had started in 1969 a temperature drop occurring in the last week of April (Figure 1) did not appear to inhibit egg-laying to much extent (Table 1).

PARASITES FROM COMMON GOLDENEYE, GREATER SCAUP AND OLDSQUAW COLLECTED ON BOUNDARY BAY, B.C., FEBRUARY, 1970

by **Keith Hodson** and **Mary Grimble,** Department of Zoology, U.B.C., Vancouver

During the winter of 1968-69 (Nov.-Feb.) approximately two dozen diving ducks were found in a weak and emaciated condition along Boundary Bay near Beach Grove, B.C. A post-mortem examination of many of these ducks which subsequently died showed that they were not the victim of gunshot wounds as had been suspected. It was then decided to examine some of these ducks more closely to determine what parasites they were carrying. Two specimens each of Common Goldeneye and Oldsquaw and one Greater Scaup were examined and all parasites were preserved. Other ducks found in a similar condition during that time included Surf Scoters, Canvasbacks, Ruddy Ducks and Buffleheads.

Table 1 summarizes the identification as far as possible, the abundance, and the location of parasites found in each duck.

Because no healthy ducks were collected it is not known what levels of parasite infestations a healthy duck normally carries. It is therefore difficult to say whether or not the over-abundance of parasites was a cause of decreased health in those ducks found; however, it appeared that these ducks were carrying very heavy infestations and this probably contributed in part to the cause of their death.

Since Boundary Bay is an area of very shallow water it is an important winter feeding area for many types of waterfowl, especially divers. This, combined with the abundance of small marine life which would provide intermediate hosts for most of these parasites, would seem to provide ideal conditions for the transmission of parasites between hosts. It is suggested that ducks arriving in an area such as this during migration would be in a somewhat lowered physical condition and therefore more subject to parasitic invasions.

Many of the ducks found in emaciated conditions were kept alive as long as possible in hopes that they

Table 1. Parasites collected from ducks on Boundary Bay, B.C., February, 1970.

Host	Number	Location	Parasite
Goldeneye No. 1	3	gizzard	nematode (F. Trichostrongylidae) (prob. *Trichostrongulus sp*)
	100's	intestine	trematode (F. Echinostomatidae, (*Acanthoparyphium sp*)
	100's	intestine	trematode (F. Strigeidae, (*Apatemen sp*)
Goldeneye No. 2	20+	intestine	acanthocephalan (*Filicollis sp*)
	1	gizzard	nematode (O. Oxyruidea)
	2	intestine	tapeworm (O. Cyclophyllidea, prob. *Fimbiaria sp*)
	6	intestine	tapeworm (O. Cyclophyllidea)
Greater Scaup	1	cloaca	tapeworm (O. Pseudophyllidea, *Schistocephalus solidus*)
	1	proventriculus	nematode, encysted, unident.
	20+	gizzard	nematode (F. Trichostrongylidae) (prob. *Trichostrongulus sp.*)
	100's	intestine	trematode (F. Echinostomatidae)
	1	intestine	nematode, unident.
Oldsquaw No. 1	100's	intestine	tapeworm (F. Hymenolepididae)
	100+	intestine	acanthocephalan (*Filicollis sp*)
Oldsquaw No. 2	100's	intestine	tapeworm (F. Hymenolepididae)
	50+	intestine	trematode (F. Microphallidae)

would recover, and at this time it was noticed that they were too weak to be able to dive to any depth for any period of time. The indications therefore are that the direct cause of death was starvation because of an inability to dive for food due to the weakening effects of the parasitic loads.

As a subject of further study this duck-parasite relation seems to have an interesting potential.

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NORTHERN SHRIKE CAPTURES SHREW

by **Al Grass**, 5666 Rumble St., Burnaby, B.C.

On April 14, 1970 while Glen R. Ryder and myself were studying Short-eared Owls, our attention was drawn to a Northern Shrike in a hawthorn bush about 40 feet from us. The bird had in its possession a small brown animal which we assumed to be a Meadow Vole (*Microtus* sp.). While the shrike was under observation, it proceeded to impale the animal on a hawthorn spine. We decided to approach more closely and to our surprise the shrike allowed us to come within 10 feet of it and seemed almost defiant. Once the bird flew we examined the small mammal more closely. It proved to be a Cinereus or Masked Shrew *(Sorex cinereus)*. According to the literature, it is apparently uncommon for shrikes to feed on shrews.

The incident took place in the municipality of Delta, some 30 miles from Vancouver, B.C.

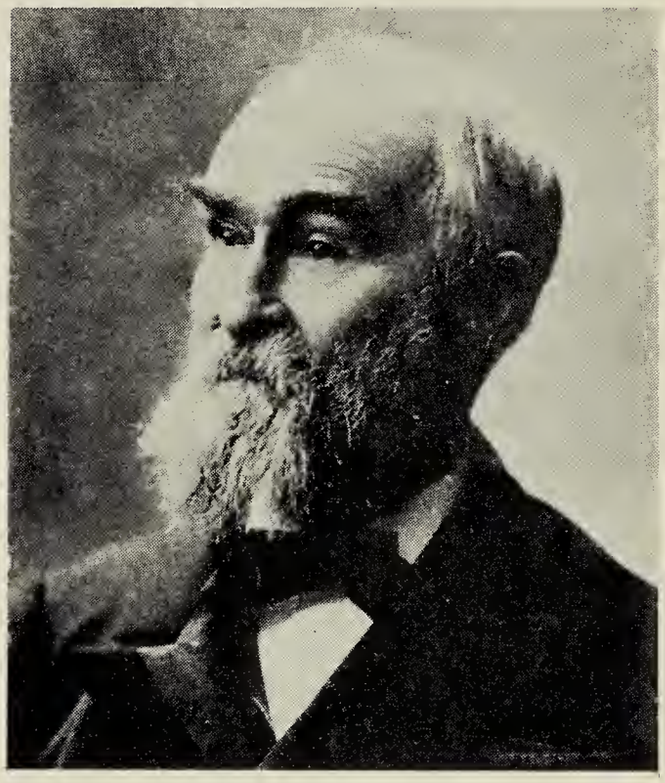
NOTES ON THE BRYOPHYTES AND LICHENS COLLECTED BY JOHN MACOUN IN THE CYPRESS HILLS

by **C. D. Bird,** Department of Biology, University of Calgary

John Macoun, one of Canada's great biologists and the first botanist employed by the National Museum of Canada, visited the Cypress Hills in 1880, 1894 and 1895. Most of the bryophytes and lichens which he collected there are recorded, often without precise data, in his *Catalogue of Canadian Plants* (Macoun 1892, 1902), a brief description of the vegetation is given in Macoun (1882), and some notes on the trips are included in his *Autobiography* (Macoun 1922).

In February, 1970, while at the National Museum of Canada, I had the opportunity to study the plants which he had obtained. The following account with a number of corrections describes his itineraries and lists the species which he found, using our current terminology.

Unless otherwise indicated, voucher specimens are at the National Museum of Canada. For the sake of brevity the wording "Saskatchewan Cypress Hills Provincial Park" has been abbreviated throughout to SCHPP. The boundaries of the West, Centre and East Blocks of this Park are regarded as those shown on the National Topographic Series 1:250,000 Cypress map sheet published in 1956. The East Block is not at present part of the Park.



JOHN MACOUN

Reproduced from Autobiography of John Macoun, M.A., Ottawa Field-Naturalists' Club, 1922.

Itineraries

In 1880 Macoun entered the east end of the Cypress Hills after crossing Swift Current Creek. He travelled along the summit of the hills until he reached the Police trail from Maple Creek to Fort Walsh and then followed this trail down to Fort Walsh. After spending a number of days there, he departed on August 15 for the Great Sand Hills to the north. As his bryophytes and lichens were collected from August 2 to August 6 it is probably safe to assume that they were collected in the East and/or the Central Blocks of the SCHPP.

In 1894 Macoun collected at Medicine Hat, then moved to Crane Lake, near Skull Creek, Saskatchewan, where he camped for over a month. From there he went up into the Cypress Hills to a place where a Mr. Andrews had a large camp. It appears likely that this camp was situated in what is now the SCHPP East Block. His bryophytes and lichens were collected in this area from June 23 to June 26.

The 1895 trip started at Moose Jaw where he outfitted his party. They left on May 18, reached Old Wives Lake on May 19, then travelled to Old Wives Creek, Wood Mountain, the Frenchman River, Fairwell Creek, Fort Walsh, and then through southern Alberta to Waterton. A number of collections were made in the Saskatchewan part of the Cypress Hills, outside of the present SCHPP, at Fairwell Creek on June 26 and 27. Some additional collections were made at Battle Creek, pre-

sumably near Fort Walsh in the SCHPP West Block, on July 4.

Lichens Collected

Alectoria chalybeiformis (L.) S. Gray

On earth, SCHPP East or Centre Block, August 3, 1880.

Slopes, Fairwell Creek, Saskatchewan, June 27, 1895.

Cetraria nivalis (L.) Ach.

On hills, SCHPP East or Centre Block, August 3, 1880.

Cladonia fimbriata (L.) Fr.

SCHPP East or Centre Block, August 2, 1880.

Collema tenax (Sw.) Ach.

On earth, SCHPP East or Centre Block, August 3, 1880.

On earth, Fairwell Creek, Saskatchewan, June 27, 1895.

Collema tunaeforme (Ach.) Ach. (as *C. furvum*)

On stones, SCHPP East or Centre Block, August 3, 1880.

Cornicularia aculeata (Schreb.) Ach. (as *Cetraria aculeata*)

On gravel bluffs, SCHPP East or Centre Block, August 3, 1880.

Evernia mesomorpha Nyl. (as *E. prunastri* var. *gracilis*)

On dry earth on a hillside, Fairwell Creek, Saskatchewan, June 26 and 27, 1895.

Mosses Collected

Amblystegium juratzkanum Schimp. (as *A. varians*)

On earth, SCHPP East Block, June 25, 1894.

A. serpens (Hedw.) B.S.G.

On earth about trees, SCHPP East Block, June 26, 1894.

Brachythecium collinum (Schleich. ex C. Müll. B.S.G.

Earth, Cypress Hills. No specimen seen at the National Museum but reported by Macoun (1892).

Bryoerythrophyllum recurvirostrum (Hedw.) Chen (as *Didymodon rubellus*)

On rocks, SCHPP East or Centre Block, August 2, 1880.

Bryum sp. (as *B. roellii*)

On damp earth, SCHPP East Block, June 25, 1894.

Along Fairwell Creek, Saskatchewan, June 27, 1895.

B. augustirete Kindb. ex Mac. (as *B. pendulum*)

Fairwell Creek, Saskatchewan. No specimen seen at the National Museum but reported by Macoun (1892).

B. creberrimum Tayl. (as *B. cuspidatum*)

Cypress Hills. No specimen seen at the National Museum but reported by Macoun (1892).

B. pallescens Schleich. ex Schwaegr.

On damp earth, SCHPP East Block, June 25, 1894.

B. stenotrichum C. Müll.

SCHPP East or Centre Block, August 4, 1880, as *B. denticulatum.*

Springy places, SCHPP East or Centre Block, August 6, 1880, as *B. denticulatum.*

On earth, SCHPP East Block, June 26, 1894, as *B. froudei.*

B. turbinatum (Hedw.) Turn. (as *B. erythrophylloides*)

On wet gravel, SCHPP East Block, June 25, 1894.

On earth by a spring, SCHPP East Block, June 25, 1894.

Drepanocladus aduncus (Hedw.) Warnst. (as *Hypnum kneiffii* var. *sendtneri*)

In pools, SCHPP East Block, June 25, 1894.

Encalypta vulgaris Hedw. (as *E. subspathulata*)

Fairwell Creek, Saskatchewan, June 27, 1895.

Fontinalis dalecarlica Schimp. ex B.S.G.

Battle Creek, SCHPP West Block, July 4, 1895. No specimen seen at the National Museum but reported in Welch (1960).

F. duriaei Schimp.

Battle Creek, SCHPP West Block, July 4, 1895. No specimen seen at the National Museum but reported in Welch (1960). This collection is the type of *F. subcarinata* Card. (Cardot and Thériot 1904) a taxon now regarded as synonymous with *F. duriaei.*

Grimmia anodon B.S.G.

SCHPP East Block, June 24, 1894.

G. arctophila Kindb.

Cypress Hills. No specimen seen at the National Museum but reported by Kindberg (1896-97) who described it

as a new species. Not mentioned by Macoun (1892, 1902) and it may be a synonym of *G. anodon* or *G. plagiopodia*.

G. plagiopodia Hedw.

On sandstone, SCHPP East Block, June 24, 1894.

Hypnum cupressiforme Hedw.

On earth, SCHPP East or Centre Block, August 4, 1880.

H. revolutum (Mitt.) Lindb.

Cypress Hills. No specimen seen at the National Museum but reported by Macoun (1892).

H. vaucheri Lesq. (as H. *subcomplexum* n. sp.)

Sandstone rocks, Cypress Hills, Saskatchewan. No specimen seen at the National Museum but reported by Kindberg (1896-97) who described it as *H. subcomplexum*, and mentioned by Macoun (1902).

Leptodictyum riparium (Hedw.) Warnst. (as *H. riparium*)

By pools, SCHPP East Block, June 25, 1894.

In water, SCHPP East Block, June 26, 1894.

Philonotis fontana var. *pumila* Brid. (as *P. fontana*)

By springs, SCHPP East Block, June 25, 1894.

Plagiomnium cuspidatum (Hedw.) Kop. (as *Mnium drummondii*)

On the base of trees, SCHPP East Block, June 26, 1894.

P. rugicum (Laur.) Kop. (as *Mnium affine*)

Around springs, SCHPP East Block, June 23, 1894.

Pottia heimii (Hedw.) Fürnr. ex Hampe

On earth, Fairwell Creek, Saskatchewan, June 27, 1895.

Pseudoleskeela tectorum (Funck ex Brid.) Kindb. ex Broth. (as *Amblystegium adnatum*)

On sandstane rocks, SCHPP East Block, June 24, 1894.

Tortula mucronifolia Schwaegr. (as *Barbula mucronifolia*)

Bank of Fairwell Creek, Saskatchewan, June 27, 1895.

T. ruralis (Hedw.) Gaertn., Meyer & Scherb. (as *Barbula ruralis*)

SCHPP East or Centre Block, August 2, 1880.

On rocks, SCHPP East or Centre Block, August 3, 1880.

Summary

The itineraries of John Macoun's collecting trips to the Cypress Hills have been described and the species of bryophytes and lichens which he collected have been listed along with their dates and probable places of collection. It has been shown that contrary to various reports, all of his collections of these plants were made on the Saskatchewan side of the Hills.

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NOTES ON THE BRYOPHYTE FLORA OF THE CYPRESS HILLS

by **C. D. Bird,** Deparmtent of Biology, University of Calgary

In 1962 I published a paper on the bryophytes of the Cypress Hills Provincial Parks of Alberta and Saskatchewan (Bird, 1962). Since that time a number of additional collections, including some new records, have been made in the area by J. S. Rowe and by R. D. Newsome who published a detailed account of the vegetation of the area (Newsome and Dix, 1968). Recent taxonomic changes and the revision of some material have resulted

Hylocomium splendens, one of the feather mosses common in the lodgepole pine woods in the Cypress Hills. (C. D. Bird #2212. Centre Block. August 3, 1960.)

in a number of corrections, new names, and additions which are worthy of note.

The following list contains all of the new records or changes which have come to my attention. Voucher specimens have been deposited in the Herbarium of the Department of Biology, University of Calgary.

Liverworts

Chiloscyphus polyanthus (L.) Corda

Saskatchewan: Centre Block, small valley running west from Loch Leven, Windfall Spruce Nature Trail, in wet hollows among white spruce roots, J. S. Rowe 1256. New to the Cypress Hills.

Lophocolea heterophylla (Schrad.) Dum.

Saskatchewan: West Block, mixed white spruce - aspen woods, north-facing slope, on log with *Tetraphis pellucida*, R. D. Newsome 61-61. New to the Saskatchewan side of the Cypress Hills.

Ricciocarpus natans (L.) Corda

Saskatchewan: Centre Block, 17-8-26-W3, floating on the surface of beaver ponds with *Lemma minor* L. and on the muddy edge of the ponds, R. D. Newsome 1-64. New to the Cypress Hills.

Mosses

Atrichum undulatum (Hedw.) P. Beauv.

This species must be removed from the flora of the Cypress Hills as, in the light of new information (Ireland, 1969), plants previously determined as this are actually *A. selwynii* Aust.

Brachythecium glareosum (Spruc.) B.S.G.

In his generic revision of North American Brachytheciaceae, Robinson (1962) indicated that he examined no North American specimens of this species and that it has been confused with the *B. salebrosum* group. The material which I had cited as this in my earlier paper was found to be *B. salebrosum*, a common species in the area.

Campylium polygamum (B.S.G.) C. Jens.

Saskatchewan: Centre Block, small valley running west from Loch Leven, Windfall Spruce Nature Trail, on moist decayed wood under white spruce, with *Chiloscyphus pallescens*, J. S. Rowe 1259. New to the Saskatchewan side of the Cypress Hills.

Eurhynchium diversifolium (Schleich) B.S.G.

The recent check list of North American mosses (Crum, Steere and Anderson 1965) places this as a syn-

Pleurozium schreberi, a feather moss common in lodgepole pine woods in Cypress Hills Centre Block. (C. D. Bird # 2213, August 3, 1960.)

onym of *E. pulchellum* (Hedw.) Jenn., a species already reported from the Cypress Hills.

Homomallium adnatum (Hedw.) Broth.

The Macoun report of this species mentioned in my earlier paper was based on a voucher (Canadian Cryptogams No. 13) in the National Museum of Canada. It was examined recently and was found to be *Pseudoleskeela tectorum* (Funck ex Brid.) Kindb. ex Broth. *Homomallium adnatum* must therefore be deleted from the bryoflora of the Cypress Hills and *Pseudoleskeela tectorum* must be added. Data on the packet indicates it was collected by John Macoun on sandstone rocks, Cypress Hills, Assiniboia, on June 24, 1894.

Hygrohypnum luridum (Hedw.) Jenn.

Alberta: near Elkwater, 13-8-3-W4, white spruce — lodgepole pine woods, on log in a creek, R. D. Newsome 40-61. New to the Cypress Hills.

Mnium.

The recent generic revision of the genus *Mnium* by T. Koponen (1968) has resulted in a number of new names for Cypress Hills species: *Mnium affine* var. *rugicum* is now *Plagiomnium rugicum* (Laur.) Kop., *Mnium cuspidatum* is *Plagiomnium cuspidatum* (Hedw.) Kop., *Mnium drummondii* is *Plagiomnium drummondii* (Bruch & Schimp.) Kop., *Mnium medium* is *Plagiomnium medium* (B.S.G.) Kop., and *Mnium punctatum* is *Rhizomnium punctatum* (Hedw.) Kop. Dr. Kopenen has examined much of my material and has made two corrections which are mentioned later.

Mnium marginatum (With.) Brid. ex P. Beauv.

Saskatchewan: Centre Block, small valley running west from Loch Leven, Windfall Spruce Nature Trail, on exposed mineral soil in forest openings, J. S. Rowe 1249. New to the Saskatchewan side of the Cypress Hills.

Philonotis fontana (Hedw.) Brid.

Saskatchewan: Centre Block, 19-8-26-W3, boggy white spruce woods, on mineral soil, R. D. Newsome 2-62; West Block, white spruce - lodgepole pine - aspen woods, north-facing slope, on wet log, R. D. Newsome 3-63. New to the Saskatchewan side of the Cypress Hills.

Plagiomnium ciliare (C. Müll.) Kop.

Saskatchewan: Centre Block, south of Lonepine Campsite, lodgepole pine woods, on rotten logs, C. D. Bird 4743. New to the Cypress Hills.

Plagiomnium medium (B.S.G.) Kop.

The record of Bird 4775 from the

Polytrichum juniperinum, hair cap moss, common throughout the Cypress Hills. (C. D. Bird # 2214. August 3, 1960.)

Saskatchewan side is in error as the plant was actually *P. rugicum*. The species is fairly common there, however, on wet soil beside streams and seepage areas. The following collections document its presence: C. D. Bird 4738, 4798, 4824, 4839, 4850 and R. D. Newsome 15-61.

Alberta: one-half mile west of Elkwater, white spruce woods, north-facing hillside, C. D. Bird 4407. New to the Alberta side of the Cypress Hills.

Plagiomnium rugicum (Laur.) Kop.

The record of Bird 4798 from the Saskatchewan side is in error as the plant was actually *P. medium*. It is quite common on both sides, however, in the same habitats as the previous species. The following collections document its presence on the Saskatchewan side: Bird 4692, 4695, 4775, 4780, 4831, and J. S. Rowe 1244.

Discussion and Summary

Five species, *Chiloscyphus polyanthus*, *Ricciocarpus natans*, *Hygrohypnum luridum*, *Plagiomnium ciliare*, and *Pseudoleskeela tectorum*, have been added while four species, *Atrichum undulatum*, *Brachythecium glareosum*, *Eurhynchium diversifolium*, and *Homomallium adnatum*, have been deleted from the bryoflora of the Cypress Hills. The revised totals now become 99 mosses and 9 liverworts. None of the additional plants are montane, hence the montane distributional element, represented by nine species, drops to 8.3% from 9.1% as given in Bird (1962). This is strikingly similar to the 8.6% present in the vascular plants (de Vries and Bird, 1968) and indicates that the two groups have similar distributional patterns.

Four species, *Lophocolea heterophylla*, *Campylium polygamum*, *Mnium marginatum*, and *Philonotis fontana*, have been added to the flora of the Saskatchewan side of the Hills, while one species, *Plagiomnium medium*, has been added to that of the Alberta side.

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ARTHUR REGINALD PRINCE, 1900-1969

by **C. D. Bird,** Department of Biology, University of Calgary

It was with deep regret and a real sense of loss that Canadian biologists, and botanists in particular, learned of the passing of A. R. Prince in Calgary on April 16, 1969.

Mr. Prince was born, and grew up, in Truro, Nova Scotia. He obtained a B.A. degree from Acadia University in 1922, and an M.A. from Harvard in 1924. He taught biology at the Nova Scotia Agricultural College from 1926 until 1933. During this period he made extensive collections of the local plants and, to a somewhat lesser extent, of the insects. Mr. Prince held various high school teaching positions in the Maritimes and in Quebec from 1933 until 1949. He then moved to Calgary where he taught at Mount Royal College for two years before joining the University of Calgary, at that time a branch of the University of Alberta.

Mr. Prince was the first biologist hired by the University of Calgary. Starting at the rank of Assistant Professor, he was promoted to Associate Professor in 1955, and remained with the University until his retirement in 1966. During this period he taught courses in Introductory Biology, Introductory Zoology, Introductory Botany, Plant Anatomy and Lower Vascular Plants. He had contact with a large number of students in these courses many of whom have since taken positions in various biological fields. He will be remembered by his students as a sincere, meticulous, and friendly perfessor whose first interest was teaching and whose primary concern was that of the betterment of his students.

The University of Calgary was very small when Mr. Prince came on staff in 1951 and was located beside Highway 1 in buildings now occupied by the Southern Alberta Institute of Technology. As Acting Head of the Department of Botany from 1956 to 1964 he played an active role in the planning of the Science and Engineering Building on the new (and present) campus occupied in 1961 and was involved in many administrative duties.

In his early years in Calgary, the demands of teaching and administrative duties left him little time for research. Later on his duties eased a little and he developed a keen interest in the local cryptogamic flora, and especially in the lichens and bryophytes. Though a physical handicap prevented him from carrying out extensive field work he was helped by his sons, one of whom, Richard, is now in a Ph.D. program in botany at the University of Aberdeen.

The Department of Biology is particularly grateful to Mr. Prince for the donation of a large number of biology books, and his insect collection. His biggest, and most valuable donation, however, was that of his plant collection which is now in the Department's Herbarium. It contains 8634 specimens of which 2029 are lichens, 325 are liverworts, 3894 are peat mosses and mosses, and 2388 are vascular plants. Approximately three-quarters of these specimens are from Nova Scotia and elsewhere in the eastern part of the continent.

In addition to his teaching, administrative and research interests, Mr. Prince was a keen gardener, numismatist, and photographer. He was also a faithful member of the I.O.O.F. St. George Lodge No. 39 and an active member of St. John the Evangelist Anglican Church.

I feel a deep personal loss at his death as he was a close friend of mine from the time I joined the staff in 1962. With our joint interest in lichens and bryophytes we had much in common.

Mr. Prince is survived by his wife Honor; four sons, John, Henry, Richard, and Theodore; and a sister, Mrs. Elaine Wehmeyer.

Mrs. Prince, in her husband's memory has established The Reg Prince Memorial Prize in Botany to be awarded annually to a student proceeding into the fourth year of a B.Sc. Botany programme at the University of Calgary.

NOTES ON ERUCA SATIVA, THE PIONEER'S POT-HERB

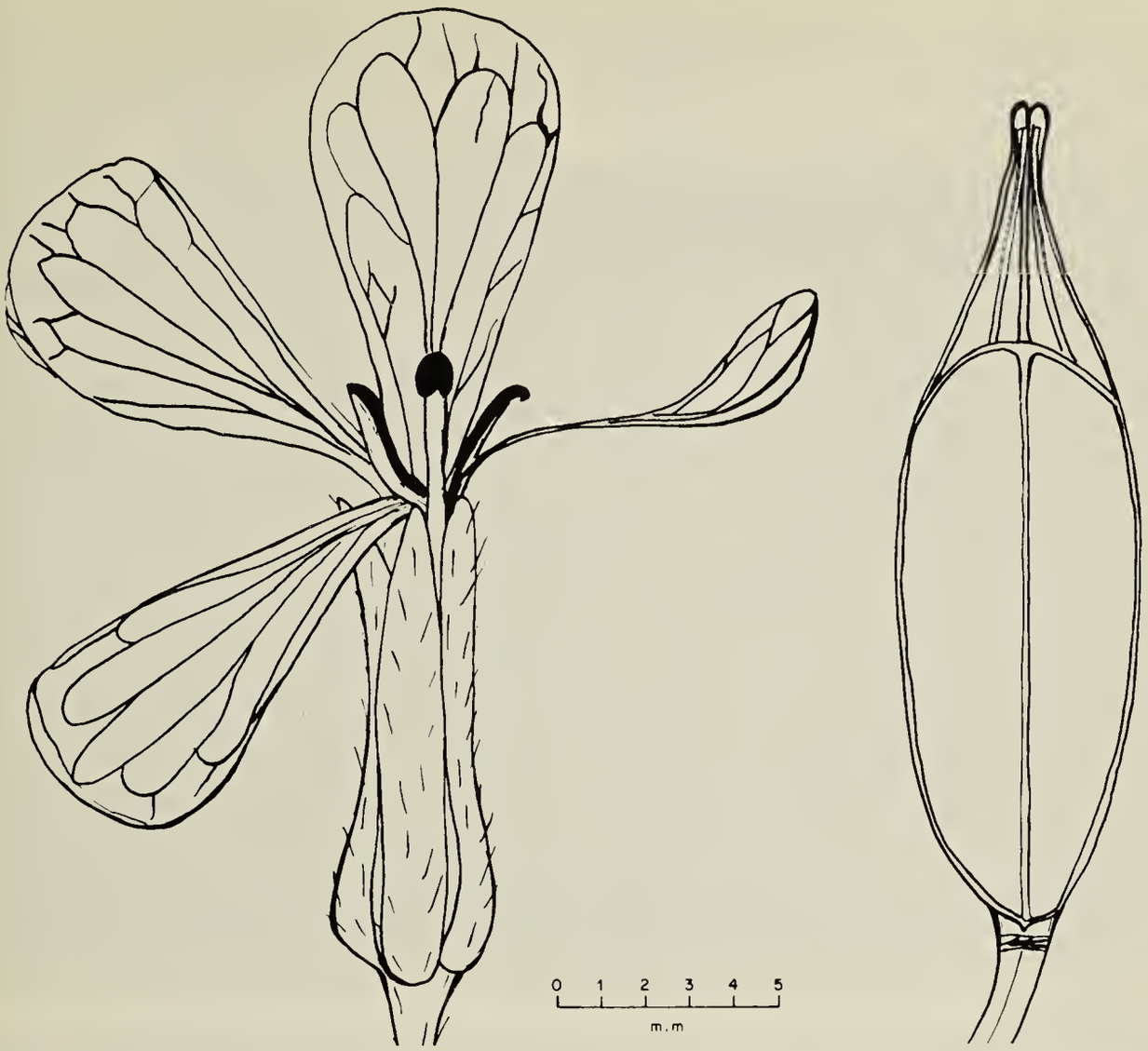
by **B. M. Hallworth,** The Herbarium, Biology Department, University of Calgary

Eruca sativa Mill. is a member of the mustard family, Cruciferae. It is a large, 20-100 cm high, spreading, rough-hairy annual or biennial, with interesting flowers. These are large, compared with those of other members of the Cruciferae; the petals are 1.5 - 2 cm long and are pale yellow. They have distinctive violet, sometimes brown, veins. The silique has a well-developed beak, and is similar to that found in the genus *Brassica.* The two genera are closely allied, but *Eruca* fruits have two rows of seeds in each valve whereas *Brassica* fruits have only one. *Eruca* can be distinguished from other yellow-flowered mustards in two ways; it has a fruit with a prominent beak, and the petals have the characteristic vein-markings. One of our related mustards, *Erucastrum gallicum,* gets is generic name from its resemblance to *Eruca.*

Eruca sativa is a native plant of the Mediterranean area, and for many years it has been cultivated as a salad plant and vegetable, and for the medicinal oil obtained from its seeds. The species name, *sativa,* from the Latin word for "sown", reminds us that it is a cultivated plant, and its common name, Rocket Salad, also suggests this. *Eruca vesicaria* (L.) Cav. is sometimes given as a synonym.

The pioneer settlers in Ontario brought seeds of *Eruca* from Europe and grew them for use as pot-herbs and in salads. Some plants escaped from cultivation and became weeds. *Eruca* seeds were also brought from Europe mixed with alfalfa seed (Clarke & Fletcher, 1909). Farmers from various parts of Ontario sent samples to the Experimental Farm, Ottawa. These came from Preston (1907), Galt (1908), Manitick (1909); East Linton, Wingham, and Laurier (1910); and from Melbourne, Markdale, and Palmerston (1911). John Macoun, the "Father of Canadian Botany", collected a plant near Ottawa in 1911. The plants had also spread to the West in alfalfa seed, but there is no reference to them being planted as pot-herbs in that region. There are reports at the Herbarium of the Plant Research Institute, Ottawa, from near Regina (1907), Bradwell (1910), and from Carnduff (1912). There are only two records of it from Alberta, from Olds (1910), and from Lacombe (date uncertain, probably before 1912). There is no record *of Eruca sativa* in the West after 1912. B. Boivin points out (Boivin, 1968-1969) that in many cases these dates and localities are not substantiated by actual specimens. *Eruca sativa* is not mentioned in the *Flora of Alberta* by E. H. Moss, and H. J. Scoggan has excluded it from the *Flora of Manitoba* because of lack of evidence.

In August, 1969, I found some plants of *Eruca sativa* growing on waste



ground close to the University of Calgary campus. One plant was found on a vacant lot, and about six plants were found on land near a house. On enquiry, I found that the house belonged to Italian immigrants, who had come to Calgary from Italy twenty years ago, and had brought seeds of *Eruca sativa* with them, to grow as a potherb, just as the original settlers in Ontario had done many years ago. They moved two years ago to the present house. The plant is now once again spreading as a weed. It has colonized the nearby piece of waste land (the plants were large and healthy), and it has spread to the vacant lot, about 40 yards away. Unfortunately, a new house has just been built on the lot, and the waste ground is due to be grassed over by the local council, so possible sites of spread are being eliminated. However, there are several rather weedy backlanes nearby, and if the plant can stand up to stiff competition from the plants already there, it will continue to spread.

The determination was verified by J. Mulligan of the Plant Research Institute, Ottawa. Specimens have been deposited in the Herbarium at the University of Calgary (UAC), and in the Herbarium at the Plant Research Institute (DAO), Ottawa.

Acknowledgements

I would like to acknowledge the assistance given by W. J. Cody, Curator of the Phanerogamic Herbarium, Plant Research Institute, when I was in Ottawa, examining the specimens of *Eruca* and correspondence from the farmers who sent in samples; also to J. Mulligan who verified the determination; and to C. D. Bird, Biology Department, University of Calgary, for suggestions regarding the manuscript.

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SASKATCHEWAN FLORA

Photographs by Fenton Vance, 1610 College Ave., Regina

Western Red Lily

Highbush Cranberry

Wood Violet

Three-flowered Avens

Blazing Star

Junior Naturalists

Edited by **Joyce Deutscher,** 7200 6th Ave., Regina

LOVE THOSE PARKS

by **Joyce Deutscher**

A year ago when I suggested that Juniors write about their experiences in provincial parks, historic sites, bird sanctuaries and similar places, there was no response. I wondered why. Now, a year later, I will write my own impressions of a provincial park recently visited.

An information folder mentioned self-guided nature trails but park attendants at the entry gate could give us no information on the trails and referred us to the recreation people. Twelve hours later we were able to track down the right person with the right information; he handed us two mimeographed sheets — one for each trail.

A well-constructed sign announced a nature trail and indicated a turn off the main road. We drove a mile or more into what appeared to be a parking lot and selected from among several criss-crossing trails the one we hoped would lead us on our adventure. We guessed right and soon found an old neatly sawed-off post firmly placed in the ground with the number one on its bevelled edge. Soon, however, we found another stake of a less permanent nature also bearing the number one. And so the guessing game continued. By careful sleuthing we were able to follow the trail but fallen logs frequently obstructed the path. It was obvious that the trail had received very little attention from park authorities since the preparation of the guide sheet.

The film show that night in the campground was an American war film, filled with violence and noise. Appropriate for parks?

As we left the park we noticed that the car ahead of us proudly bore the sticker "Love those Parks". My sentiments were different at least after having visited *this* park.

I remembered by way of contrast a day spent in Theodore Roosevelt National Park across the border — its small interpretative museum, a well informed Park Naturalist, well-kept nature trails, a glowing campfire and evening slide show of the park flora, fauna and geographical features.

Do Saskatchewan people not feel the need for park programs similar to those I have just described? Do they go to parks to enjoy city things— golfing, dancing, arts and crafts, ball games, scavenger hunts, eating and littering?

And what of you young people? Do you no longer write about your nature experiences in parks because there are so few of these? Perhaps parks are for motor toboggans, mineral exploration, logging operations, ball games and horseback riding. Perhaps people who really care about nature don't go to parks.

"Love those parks!" Do you?

NATURE HOBBIES

by **Helene White,** Edmonton

Growing plants in a miniature greenhouse or terrarium gives year-round pleasure. A terrarium is usually a glass bowl or tank. We are going to use a 32-ounce mayonnaise jar for our first attempt. Later you may wish to graduate to a larger container such as a cracked or leaking aquarium or a gallon mustard or pickle jar.

Fascinating mosses and lichens can be found nearly everywhere. Two different types grow in the sparsely grassed area on the north side of our house, while another grows in the dense shade of an evergreen boulevard in the heart of Edmonton. So go out and start searching for your plants. Small plastic bags will keep your specimens moist and healthy and a teaspoon will do the digging. Select only tiny plants that won't outgrow their new home too quickly. Bring

home far fewer plants than you think you will need, for one teaspoon of moss goes a long way in a tiny landscape. The moss lining in my terrarium came from one single mossy stick so I barely disturbed the forest floor at all. When collecting never deface a special spot but search for similar plants in the surrounding area. Always treat nature with respect and leave a spot as you found it. Keep your eyes open for small lichen covered stones, tiny dried branches, and mossy bits of bark. These can turn your greenhouse into a rocky glade or miniature forest.

When you have gathered your plants together, you are ready to start creating. Lay your jar on its side and place a thin layer of washed sand or small pebbles in this pocket. Add a few pieces of charcoal salvaged from a campfire. Over this base spread a layer of soil. The soil level should not be higher than the mouth of the jar but can be built up into a hill for background, near the bottom of the jar.

Arrange your plants artistically in their new surroundings. Spread their roots, cover with a wee bit of soil and tap them firmly into place. A teaspoon and blunt pencil are dandy tools for reaching hard to get at corners. Cover all bare earth with moss. Sprinkle the garden lightly with water and put on the lid.

It is important to place your terrarium in a light place but away from direct sunlight. If it gets the correct amount of light the plants will take root and grow, maintaining themselves on their own water and oxygen as well as the minerals from the soil for a long time.

Should the sides of your terrarium fog up with condensed moisture remove the lid until they clear and then replace it. If this condition persists, perhaps you have your terrarium in a spot that is too warm or sunny. Try a new location.

BANDING HORNED OWLS

by **Rosemary Nemeth**, Yellow Creek

On May 17, Dr. Houston and two of his helpers came out to band the young horned owls. This year my Dad and I were able to find nine nests. There were two neighbours who told us about a few nests which helped us a great deal. But we found most of the nests ourselves. We started looking for them in March.

The young from only eight nests could be banded. There was one nest which had one two-day-old nestling and one egg when we first climbed up to it. Dr. Houston left us two bands to band the little ones in three weeks time. I always liked watching Dr. Houston's helpers climb the trees with great skill; but my dad took it quite easy by using a ladder to get half way up the tree. But when he got to the nest it was empty. We had noticed through the period of three weeks that there weren't any little ones looking out of the nest although the old ones flew around the nest during this time.

Altogether twenty-five young were banded from eight nests. Each nest contained bits and pieces of food.

This year was a very good one for finding horned owl nests and I am looking forward to another trip next year.

LETTERS WELCOME

Congratulations to Rosemary Nemeth for her continued interest. Let's hear from more of you. Send your letters and comments to Mrs. Joyce Deutscher, 7200 6th Ave., Regina, by October 15 for inclusion in the next Junior Naturalists Section of the *Blue Jay*.

The Blue Jay Bookshelf

A STUDY OF SEX DIFFERENTIAL IN THE SURVIVAL OF WAPITI. 1970. By Donald R. Flook, Canadian Wildlife Service Report Series, No. 11. The Queen's Printer, Ottawa.

To the average reader the title of this work may seem somewhat formidable. It is, in fact, a very detailed analytical study which Mr. Flook has presented to the University of Alberta in partial fulfilment of the requirements for the degree of Doctor of Philosophy. As such, it is presented in a systematic, carefully organized way. Various claims or hypotheses made by the author must be substantiated with very precise technical data. This necessarily reduces the popular appeal of the book, but such is the case with the report of any scientific research project.

Briefly, the study was made to help us understand the problem of expansion of wapiti *(Cervus canadensis)* populations at the expense of other members of the plant-animal community such as the mule deer, moose and bighorn sheep. It seeks the causes of an apparent unbalanced sex ratio favouring females and the effect of this on survival of the wapiti population. The name wapiti is preferred by the author because the word elk properly refers to the European elk, a moose-like animal quite different from the wapiti.

Once a victim of overhunting, wapiti have since increased under protection and now occur in both forests and grasslands in many wildland areas of the four western provinces and of the western United States. In several National Parks controlled slaughters have prevented a depletion of winter forage crops and have regulated wapiti populations within the carrying capacity. During periods of high wapiti density an uneven sex ratio favouring females actually does not lower the rate of increase in a population. Since wapiti are polygamous, a reduction in the number of males could, where food is limited, contribute to sustaining high reproduction rates and female survival. According to Flook, this contributes to the ability of the wapiti to increase their abundance and distribution at quite a high rate.

This study, then, examines population dynamics and studies, from specimens collected, some physical and physiological factors affecting the welfare of the wapiti to learn how these factors are phased with the seasons of the year and how they affect animals of different sex and age. Factors studied include tooth wear, growth, reproductive cycle, fat reserves and adrenal activity. It should also be of interest that the two main wapiti predators, wolves and cougars, have little or no effect on the composition of the wapiti population.

Specific methods for each phase of the study are discussed in the appropriate section. Graphs and charts are used to great advantage and contribute to conciseness and clearness. Statistical analysis is used to a considerable extent, in linear regression lines, confidence intervals for means, and fat indices, etc. To read the report, therefore, requires a certain amount of knowledge in related fields. Photographs and photomicrographs are interesting although not numerous.

The results and conclusions are left to the reader's curiosity, as are further questions and hypotheses. To the student of ethology or ecology of large mammals they are interesting and motivating. To the junior naturalist they will seem complex but intriguing. To the man in the street they mean much less. But to all readers, such problems represent a challenge, for wild animals will be the first to become extinct if public apathy continues with regard to world population and the preservation of our ecosystem.—*Paul Hart*, Regina.

BIRDS OF THE CHURCHILL REGION, MANITOBA. 1970. By Joseph R. Jehl, Jr. and Blanche A. Smith. Special Publication No. 1, Manitoba Museum of Man and Nature, Winnipeg, Man. 87 pp. Price $2.50.

This is the first Special Publication of the Manitoba Museum of Man and Nature, beginning a series that should play a role equivalent to that of our own SNHS Special Publications in Saskatchewan.

The senior author, Dr. Joseph R. Jehl, Jr., now of the Natural History Museum in San Diego, spent four summers from 1964 to 1967 near Churchill, studying shorebirds. He found nests of many species and incidentally carried out an important study of the Smith's Longspur. Less information is given concerning Mrs. Blanche A. Smith, who resides in Churchill.

Churchill is strategically situated at the "treeline", the transition between boreal forest and open tundra. Hence it marks the northern and southern limits of the breeding ranges of many boreal and arctic species, respectively, as is evident from perusal of the range maps in Godfrey's *Birds of Canada*. Since the Hudson Bay Railroad was completed in 1930, making this the most accessible area of tundra on this continent, the observations of a large number of competent ornithologists are available.

The Species Accounts include discussion of 209 species. Ten of these are hypothetical and about 31 are casual or accidental. Definite breeding evidence is given for 79 species. Data for nests found by other observers are sometimes vague or incomplete (e.g. Barn Swallow) or one must refer to another publication for details (e.g. White-winged Scoter and Myrtle Warbler). A Killdeer nest with seven eggs, if not a typographical error, is sufficiently unusual — Bent gives a maximum of five eggs — to warrant mention of the observer and further details. Only for a few species are historical records cited and changes in status over the years assessed.

The major strength of the publication is the information concerning 855 completed clutches of 47 species. The range of nesting dates is included in each species account and the number of eggs in each nest tabulated in an appendix. This is an exemplary and valuable collection of breeding information, representing a great many hours of skilled fieldwork.

Significant northward extensions of range, beyond those mapped by Godfrey, are given for the Blue-winged Teal, American Coot, Hermit Thrush, Myrtle Warbler — and perhaps the Palm Warbler, if the "broods" seen annually were sometimes flightless or nearly so. There is a minor extension for the Pine Grosbeak and a southward extension of the American Golden Plover's breeding range. More detailed assessment of a published 1939 extralimital nesting record of the Loggerhead Shrike would have been welcome.

A color photo by Mrs. Smith graces the front and back covers and the booklet contains four habitat photos and photo portraits of nine species by Jehl. There are three maps (which fail to show the Fox Islands, the Rocket Range and McLeod Lake) and two sketches by James A. Carson. A foreword by Robert W. Nero and succinct sections headed Introduction, Description of Area, Previous Ornithology, Changes in the Environment, and Birding at Churchill, are all useful and interesting.

SUMMARY: This is an up-to-date, well-written, authoritative account of the birds of an important, thoroughly-studied area, with extensive nesting data. Anyone interested in the distribution of birds in Western Canada and anyone contemplating an excursion to Churchill, will find it invaluable. *C. Stuart Houston*, Saskatoon.

Letters and Notes

RACHEL CARSON NATIONAL WILDLIFE REFUGE

On the seacoast of Maine on June 27, 1970, the Rachel Carson National Wildlife Refuge was officially dedicated by the American Secretary of the Interior, Walter J. Hickel. In his dedication speech, Mr. Hickel said that because of the fame of *Silent Spring*, much of the world remembers Rachel Carson as "a crusading prophet — the last angry woman, so to speak." He added, however, that friends who knew her better saw her as sensitive and creative with a great sense of humour. Ill-fitted physically for outdoor research, she persevered because she loved her work and the marvels of the living universe. In her day-to-day observations, she gradually grew aware that something was going wrong — that man was committing biological suicide. Fact piled upon fact in her calm, scientific mind. Effects called for causes and she found them. She also found that nothing was being done about it. It was then that she went on the attack, and the rest is history.

Few individuals have been recognized by their contemporaries as has Rachel Carson. But perhaps more than all the other tributes paid her, she would have cherished the dedication to her of the refuge close to Upper Wells Marsh, where the sea has surrendered the land over eons of time, and where a small expanse of this earth is being dedicated to its original role—as a resting and feeding place for migratory waterfowl, a home for marsh species, a nursery for many forms of marine life, and also a refuge for people.

In dedicating the refuge, Mr. Hickel also called for a re-dedication of its users, to a better understanding of man's relationship to his environment, on the national and international level. And he promised to travel through the States to do a series of environmental inspections around the nation. Here in Canada we sense the same growing public awareness of the problems that Rachel Carson was sensitive to, and we welcome the recent concern shown by the conference of provincial premiers that the Canadian government should begin to take national responsibility for these matters.

COMMON BUSHTIT

As a follow-up to the photograph of the bushtit's nest in the June issue of the *Blue Jay* I must report on my little bushtits which built a hanging nest seven feet up in our Arbutus tree. They hatched five or six babies assisted by me (I chased the cats). There was a period of fierce activity while they were feeding them and I saw them better then. I saw one of them beside a chickadee and the chickadee looked like a giant. When the babies were all flying about (playing tag yet!) I saw a large hole in the side of the nest. The next day the nest fell off the branch. It had lasted as long as it was needed — neat, I call it. When I examined it thoroughly, I discovered it to be the softest, warmest, lightest thing. I also wondered if the parent birds had broken it open to launch the babies. They all departed soon after but appeared again about two weeks later and had a hearty feed of aphids off the roses. That is the last I saw of them. (It was also the last I saw of the three cats who had been here daily.)—*Della Allen*, Vancouver.

DECLINING BIRD LIFE

Like Rachel Carson whose book made the first really effective case against DDT I am pretty well sure that DDT is the villain that caused so many of our birds to disappear or decline in numbers in the district in which I live. DDT has been used against the woodborer moth which affected pine forests. The infected areas were sprayed from the air with planes equipped with spray equipment.

Shortly after, in this same area, when the DDT got into the streams and waters stocked with fish, the fish started to die off, particularly fingerlings. Some of the bigger fish that survived spawned eggs which weren't fertile and wouldn't hatch. Similarly, birds affected by DDT also lay infertile eggs, a fact which threatens the survival of the species.

Since DDT is now banned from the market, I am wondering how long it will be before the residual effects of the pesticide will disappear.

In the period 1928-1945, in my area, which is located in the western part of central Alberta, there were many more species of birds than there are today. As a schoolboy, I used to build bird houses which were often occupied by tree swallows, which I have not now seen for at least two years. The mountain bluebird used to be common here, but during the last few years I have seen only one pair of them around and the bluebird houses haven't been occupied by them for at least two years. I remember in the 1930's and 1940's the nighthawks were numerous, and their nests were found on the ground in wooded clearings, roadsides and wild pasture lands. Since 1950 I have not seen the nighthawk.

Other birds that have declined or disappeared from this area are as follows:

1. Hairy Woodpecker, disappeared
2. Sharp-tailed Grouse, disappeared
3. Brown-headed Cowbird, disappeared
4. Red-winged Blackbird, declining
5. Brewer's Blackbird, disappeared
6. Rusty Blackbird, disappeared
7. Eastern Kingbird, declining
8. Saw-whet Owl, disappearing
9. Common Loon, disappearing
10. Bald Eagle, disappearing
11. Blue Jay, declining
12. Long-billed Dowitcher, disappeared
13. American Avocet, disappearing
14. Ring-necked Pheasant, declining
15. American Redstart, declining
16. Short-eared Owl, disappeared
17. Pigeon Hawk, disappeared
18. Hawk Owl, disappeared
19. Sharp-shinned Hawk, disappeared
20. Cooper's Hawk, declining.—*Helge S. Abrahamson*, Box 268, Sylvan Lake, Alberta.

RAILROAD RIGHT-OF-WAYS

I have long had the impression that the best example of conservation of habitat of wild flowers is the sloped ungrazed banks of the railway embankments cutting across our provinces. Wild flora grows as it lists, according to natural wind and weather. The cattle are fenced away from the lethal approach of the trains (though the menace lessens year by year). But these strips of virgin sod and grassland certainly contain more different root systems of various wild flowers than roadsides or headlands to fields.

Wild strawberries used to like the slope of the CPR or CNR tracks when I was younger and one had a slope to lie along while squinting for the best berries at eye level.

It has often been in my mind that it will be a pity if, when the tracks are taken up (as present trends seem to suggest they will be) the embankments are not retained as wild flower habitats.—*Mrs. Marion Nixon*, Redvers, Sask.

CHILDHOOOD INTEREST RENEWED

A year ago I found two copies of *The Birds of North America* in a Weyburn bookstore, and I bought them for my two nephews for Christmas to further their interest in birds. Now I want a third copy for myself, for through the boys' interest in birds a somewhat flagging interest on my own part has become renewed.

As a young lad, I was extremely interested in birds and as soon as I had nickels and dimes enough saved up, I purchased a set of Reed's "Pocket Bird Guides" — then the standard birders' books — and also a copy of Taverner's *Birds of Eastern Canada;* all three of

which I still have, though they are considerably the worse for wear.

Later, my interest swung more in the direction of wild plants, a childhood interest which becomes increasingly worthwhile as time goes on. I will have to make it a point to attend one of your summer conventions and go on a field trip with one or more of your experienced botanists. I think I should enjoy that immensely.

I have just finished reading the "Twenty-five Years" history of the Regina Natural History Society, and have become intrigued by the several references to a little Arcadia or natural Utopia called "Hidden Valley". When I come to Regina, I should like to visit this spot, and I should also like to see the Wascana Waterfowl Sanctuary.

Speaking of waterfowl, I should like to mention the number of geese seen here in the past spring migration. I haven't seen so many flocks passing over since the twenties, and I'm left wondering whether they have taken a new migration route, since our prairie sloughs have become flooded, or whether the population has increased to such a marked extent. The latter would seem to be rather unlikely but anyway it is certainly nice to see so many again.—*John A. Kurbs,* Lampman.

CO-OPERATIVE SPRING MIGRATION STUDY

In March of this year, we again requested *Blue Jay* readers to co-operate in the continent-wide migration survey. Since then we have learned that the U.S. Fish and Wildlife Service is no longer sponsoring the scheme and hence records for these selected species will no longer have the same significance. The *Blue Jay* has therefore regretfully decided not to print these lists, and sends apologies to those observers who once again co-operated in submitting their reports. Please come to the Annual Meeting prepared to discuss whether the Society should itself sponsor some similar project in the future.

1971 BOOKINGS

The following items must be purchased by our BOOKSHOP in quantities, and unsold stock is not returnable. Members are asked to book their requirements before September 30 so that adequate stock may be brought in well before Christmas. Bills will be sent with purchases. Order from The *Blue Jay Bookshop,* Box 1121, Regina, Sask.

"BEAUTIFUL CANADA" Calendar, 1971. 12 magnificent colour photos across Canada..... $1.00

BIRD WATCHERS DATE BOOK—this favorite has dated spaces for daily jottings and weekly notes. Price not firm, about $1.85

RENEW NOW!

Please renew your SNHS suscription-membership for 1971 as soon as possible instead of waiting until late December. This will distribute the work of processing memberships so that they will not pile up in the busy pre-Christmas season when mail is slow. It will also help our volunteer office workers, and save the time and money required to invoice you.

Please indicate whether your subscription-membership is a renewal or a new membership (i.e., not a member in 1970). See back cover for fee rates, and the Treasurer's new address. Cheques should be made out to the Saskatchewan Natural History Society.

Supporting ($5.00) and *Sustaining* ($10.00) memberships are most welcome for the financing of special SNHS projects, since the regular $3.00 fee barely covers the cost of printing and mailing the Society's publications. A receipt for income tax purposes will be sent for any contribution over the $3.00 fee.

ANNUAL MEETING

The SNHS holds it annual meeting this year, October 16-17 in Saskatoon. There will be registration and an informal social hour Friday evening. There will be business, entertainment and coffee all day Saturday. Watch the *Newsletter* for further details.

THE SASKATCHEWAN NATURAL HISTORY SOCIETY

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All items for publication should be submitted to George F. Ledingham, Editor, 2335 Athol Street, Regina.

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The classes of memberships in the SNHS are as follows: *Regular*, $3.00; *Supporting*, $5.00; *Sustaining* $10.00. Bulk orders (minimum of five to one address) are available to junior club members and to educational institutions at the rate of $3.00 for the first subscription and $1.00 for each additional one.

Send all renewals and new memberships to THE TREASURER, SNHS, Box 1321, Regina, Saskatchewan. (Note: Bookshop orders and general inquiries should be sent to Box 1121.)

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